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पुस्तकालय

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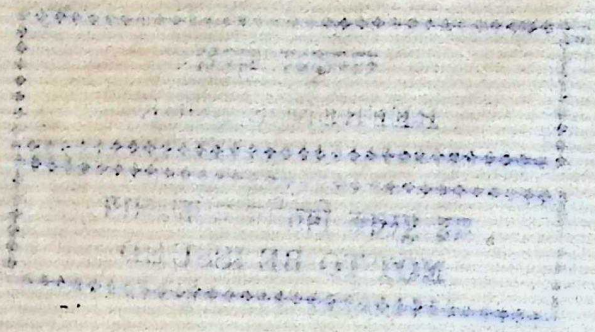

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सोऽहम् ।

Yoga-Mīmānsā

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EDITED BY

S'RĪMAT KUVALAYĀNANDA

(J. G. GUNE)

October, 1924
Fourth Impression

Vol. I No. 1

KAIVALYADHĀMA

Post—LONAVLA

BOMBAY—INDIA

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तदेकोऽवशिष्टः शिवः केवलोऽहम् ।

I alone persist : Blissful : Absolute.

ॐ

सोऽहम् ।

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Yoga-Mīmānsā

सर्वं खल्विदं ब्रह्म ।
All this is, indeed, Brahman.

नेह नानास्ति किञ्चन ।
There is nothing here apart from it.

EDITED BY

S'RĪMAT KUVALAYĀNANDA

(J. G. Gune)

October, 1924
Fourth Impression

Vol. I No. 1

KAIVALYADHĀMA

Post-Lonavla

(Bombay-India)

शरीरमाद्यं खलु धर्मसाधनम् ।

Surely Health is the primary requisite of spiritual life.

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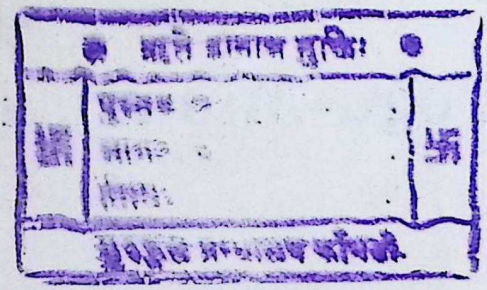

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ॐ

तदेकोऽवशिष्टः शिवः केवलोऽहम् ।

सोऽहम् ।

YOGA-MĪMĀṄSĀ

VOL. I OCTOBER, 1924 NO. 1

Editorial Notes

MAY the Maker of all make this journal a success. Blessed is the name of the Lord. May He bless the workers of the Āśrama with a happy and prosperous career as servants of the world which is only the Lord Himself objectified. May He, that has created us in His infinite wisdom lead us to the light that is beyond all darkness.

◈ ◈ ◈

THE *Yoga-Mîmâṅsâ Quarterly* will publish researches of the *Āśrama Kaivalyadhâma.* The workers of this Āśrama are tackling, according to the modern scientific methods, the great Yogic culture of India in its different aspects. Nothing that has not been tested either clinically or in the laboratory will appear in the pages of this periodical. What truths will be revealed by these researches nobody can predict. But it looks very probable that the research-work of the Āśrama will enrich the field of physiology, psycho-physiology, therapeutics, spiritual and physical culture, etc. Years of labour in psycho-physiology may help the scholars to solve some of the toughest problems of philosophical thought.

◈ ◈ ◈

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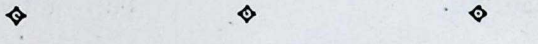
THE matter will appear under three sections: *The Scientific*, *The Semi-Scientific* and *The Popular*.



THE *Scientific Section* will record original laboratory experiments conducted by the workers of the Āśrama. In the case of X-Ray, faithful prints of the original radiographs will be given. As these, however, represent only static conditions, observations on the fluorescent screen will be accurately stated whenever dynamic conditions are under discussion. Every experiment will be accompanied by a table of facts recorded by the operator during his work. Thus this section will present scientific data collected by the Āśrama to the men of science who may draw their own conclusions and also may critically examine the conclusions reached by the scholars of the Kaivalyadhāma. These scholars are open to conviction and under no circumstances claim infallibility. No superhuman agencies will be introduced into the laboratory work. It will be conducted in strict accordance with the recognized scientific methods of the West. Whatever the spiritual development of the worker, he will not allow anything to filter to these pages before applying to it a severe scientific test.

THE *Semi-Scientific Section* will contain articles on the conclusions drawn by the scholars of the Āśrama from their researches. The application of these researches to therapeutics, spiritual and physical culture etc., will be discussed in the pages of this section. At times the conclusions arrived at may not be final. In that case their hypothetical nature will be clearly stated. Copious scientific notes will be given. It is only on account of these notes, which to men of science are unnecessary, that the section is called Semi-Scientific. The first two sections will be complementary to each other, and should be read together.

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We want to emphasize one point regarding the scientific notes. They will appear only once in the pages of this journal. On subsequent occasions the readers will be referred to back numbers of this periodical.

◈ ◈ ◈

The *Popular Section* will also bear on the researches of the Āśrama; but here laboratory evidence will not play a prominent part. Much will be based on clinical observations. Again, simple scientific facts which are known even to a beginner of scientific studies, will be elaborated here with a view to make the treatment so simple as to be readily intelligible to any man of average English education. For these reasons the section is termed *Popular*.

◈ ◈ ◈

We originally intended to have only three sections. But we now think it necessary to add one more. It will be called *Miscellaneous* and will contain authoritative letters of criticism from our readers along with their answers from the workers of the Āśrama. Original contributions from persons labouring in the same field as is being investigated by this Āśrama, will also be published in this section, provided they are strictly scientific. We earnestly request all men of science to take keen interest in the problems discussed in this journal and to help us in making it a grand success.

◈ ◈ ◈

The work of investigation that is carried on at present in the Āśrama, is mainly physiological. Yogic physical culture and therapeutics also play a prominent part. Hence the readers are likely to carry the impression that Yoga is only a system of physical culture and therapeutics. But nothing can be farther from the truth than this impression. The physical side is only a minor aspect of Yoga which is chiefly mental and spiritual. Scientific investigation of these main features will start as early as possible, and then psycho-

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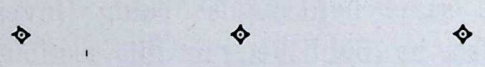
physiological researches will find place in these pages, along with the physiological ones.

We earnestly request the general public to take keen interest in our work and to co-operate with us by showing their active sympathy to the Āśrama. We are anxious to serve humanity; but we can do so only if our brothers and sisters, not only of India but also of other countries, come forth to encourage us in every possible manner. We beg to point out here that the easiest way to help us lies in subscribing to the journal and fervently hope that no man of means will hesitate to render us this assistance.

Much is expected of the men of science and especially the medical men. The subject is such as deserves full attention at the hands of this section of the educated public. The researches of the Āśrama are likely to help them in their work. We, therefore, sincerely solicit their active sympathy and co-operation.



We shall spare no pains in making the periodical what it is promised to be. Care will be bestowed on every aspect of the work and no detail will be neglected. It will be our duty to make the journal as interesting and instructive as it is possible for the Āśrama.

In spite of our zeal and attention, some defects may have been left in the execution of the work. We humbly crave the indulgence of our subscribers for the same.

With these few words of introduction, we present the first issue of the Yoga-Mīmāṅsā to our readers, hoping that this and the subsequent numbers will find favour with them.

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The Scientific Section

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SYSTEM OF TRANSLITERATION

Letters, their sounds, and a description of these sounds :—

अ	A	Pronounce	'A'	like	'u'	in	'but'.
आ	Ā	,,	'Ā'	,,	'a'	,,	'far'.
इ	I	,,	'I'	,,	'i'	,,	'pin'.
ई	Ī	,,	'Ī'	,,	'ee'	,,	'feel'.
उ	U	,,	'U'	,,	'u'	,,	'fulsome'.
ऊ	Ū	,,	'Ū'	,,	'oo'	,,	'wool'.
ऋ	Ṛ I	,,	'Ṛ I'	,,	'rö'	,,	German.
ॠ	Ṛ Ī	,,	'Ṛ Ī'	,,	,,	,,	,, with a strong accent.
ऌ	Ḷ I	,,	'Ḷ I'	,,	'lö'	,,	,,
ए	E	,,	'E'	,,	'a'	,,	'fate'.
ऐ	AI	,,	'AI'	,,	'ai'	,,	'aisle' but not drawled out.
ओ	O	,,	'O'	,,	'o'	,,	'over'.
औ	AU	,,	'AU'	,,	'ou'	,,	'ounce' but not drawled out.
क	KA	,,	'K'	,,	'k'	,,	'kill'.
ख	KHA	,,	'KH'	,,	'kh'	,,	'ink-horn' or like 'ch' in 'Loch' (Scottish).
ग	GA	,,	'G'	,,	'g'	,,	'girl'.
घ	GHA	,,	'GH'	,,	'gh'	,,	'log-house' or 'ghee'.
ङ	N̄A	,,	'N̄'	,,	'n'	,,	'king' or 'link'.
च	CHA	,,	'CH	,,	'ch'	,,	'church'.
छ	CHHA	,,	'CHH'	,,	the second 'ch' in 'churchill'.		
ज	JA	,,	'J'	,,	'j' in 'join'.		
झ	JHA	,,	'JH'	,,	palatal 'z' as in 'azure'.		
ञ	N'A	,,	'N'	,,	'n' in 'pinch'.		
ट	Ṭ A	,,	'Ṭ'	,,	't'	,,	'tub'.
ठ	Ṭ HA	,,	'Ṭ H'	,,	'th'	,,	'pot-house'.

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SYSTEM OF TRANSLITERATION

Letters, their sounds, and a description of these sounds :—

ड	ḌA	Pronounce	'Ḍ'	like	'd'	in	'dog'.
ढ	ḌHA	,,	'Ḍh'	,,	'dh'	,,	'mad-house'.
ण	ṆA	,,	'Ṇ'	,,	'n'	,,	'splinter' or 'and'.
त	TA	,,	'T'	,,	dental 't' as in 'thin', or like the French 'T'.		
थ	THA	,,	'TH'	,,	'th'	in	'thunder'.
द	DA	,,	'D'	,,	'th'	,,	'then'.
ध	DHA	,,	'DH'	,,	'th'	,,	'this'.
न	NA	,,	'N'	,,	'n'	,,	'no'.
प	PA	,,	'P'	,,	'p'	,,	'paw'.
फ	PHA	,,	'PH'	,,	'ph'	,,	'top-heavy', or 'gh' in 'laugh'.
ब	BA	,,	'B'	,,	'b'	,,	'balm'.
भ	BHA	,,	'Bh'	,,	'bh'	,,	'hob-house'.
म	MA	,,	'M'	,,	'm'	,,	'mat'.
य	YA	,,	'Y'	,,	'y'	,,	'yawn'.
र	RA	,,	'R'	,,	'r'	,,	'rub'.
ल	LA	,,	'L'	,,	'l'	,,	'lo'.
व	VA	,,	'V'	,,	'w'	,,	'wane'.
श	S'A	,,	'S'	,,	'sh'	,,	'ashes'.
ष	SHA	,,	'SH'	,,	a strong lingual with rounded lips.		
स	SA	,,	'S'	,,	's'	in	'sun'.
ह	HA	,,	'H'	,,	'h'	,,	'hum'.

ळ ḶA A dento-lingual pronounced with a little rounding of lips.

Visarga—Ḥ ; Nasalized म् as in संयम—Ṁ ;

Nasalized म् as in मीमांसा—Ṅ.

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N. B. — Those of our readers that claim no acquaintance with anatomy and physiology will do well to read The Semi-Scientific Section first.

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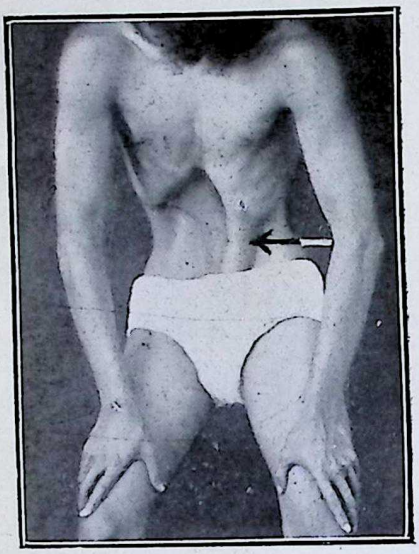
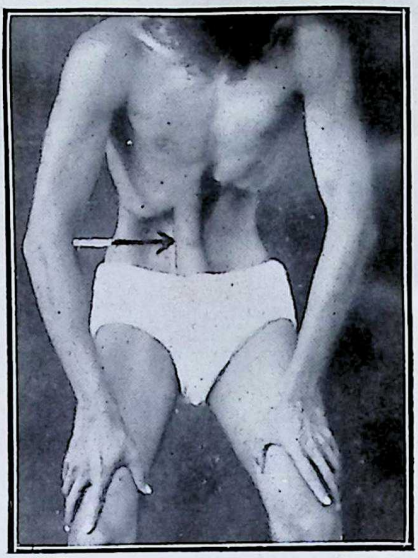
Fig. I



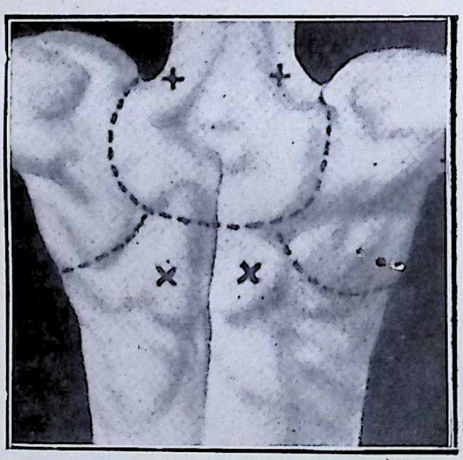
The Rectus Abdominis Left
used in
Uḍḍiyâna and Nauli.

Fig. II



The Rectus Abdominis Right
used in
Uḍḍiyâna and Nauli.

Fig. III



The Muscles of the Back
used in
Uḍḍiyâna and Nauli.

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WHAT IS UḌḌIYĀNA ?

Uḍḍiyana is a Yogic exercise for raising the diaphragm. But this definition hardly conveys any idea as to what the exercise really is. Nor does it say anything regarding its physiological effects on the system. All these points are, however, made clear in the different experiments bearing on this practice, that are described in the following pages. For instance the position of the colon during this exercise is given in X-Ray Experiment II. Its physiological effects on the cecum are mentioned in an article on cecal constipation in the Semi-Scientific Section. The technique and the superficial aspects of the exercise, however, are as follows.

THE TECHNIQUE :—

Uḍḍiyāna is practised in various positions, four of which are represented in Figs. IV to VII. A survey of these pictures will at once make it clear that some features are common to all these positions whereas others are peculiar to each one of them. Only the common technique will be indicated here, leaving the special parts of each exercise to be detailed in the information recorded on pages facing its illustration.

The exercise of Uḍḍiyāna starts with a complete exhalation. The muscles of the abdomen are then fully relaxed and pushed well under the ribs. This is followed by the contraction of the back muscles, especially the latissimus dorsi and the trapezius. (Fig. III). These two muscles which control the backbone and hold it in its place, are then further brought into play and are made to exert an upward pull on the spinal column. This pull on the back side is supplemented on the abdominal side by an upward and inward push of the rectus abdominis (Figs. I and II), producing the

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concave appearance shown in Figs. IV to VII. As soon as the student feels that he can no longer keep the breath out, he relaxes his muscles; and when the abdomen has returned to its original shape, slowly inhales. Utmost care is necessary in keeping the respiration slow and steady.

This exercise has been studied under the X-Ray. Very interesting and valuable data have been collected. Two X-Ray experiments are published in this issue and an article discussing the therapeutical value of this Yogic practice is included in the Semi-Scientific Section.

Though Figs. IV to VII represent poses that are superficially different, yet from the point of view of their effect on the colon, the first three may be taken to be similar. The last one deserves a separate treatment, and will be taken up on some other occasion for a detailed study. The radiograph given in X-Ray Experiment II, however, was taken in a position quite different from the four illustrated here. But it can fairly represent the condition of the colon in the first three poses. The last statement is made on the strength of the screen observations.

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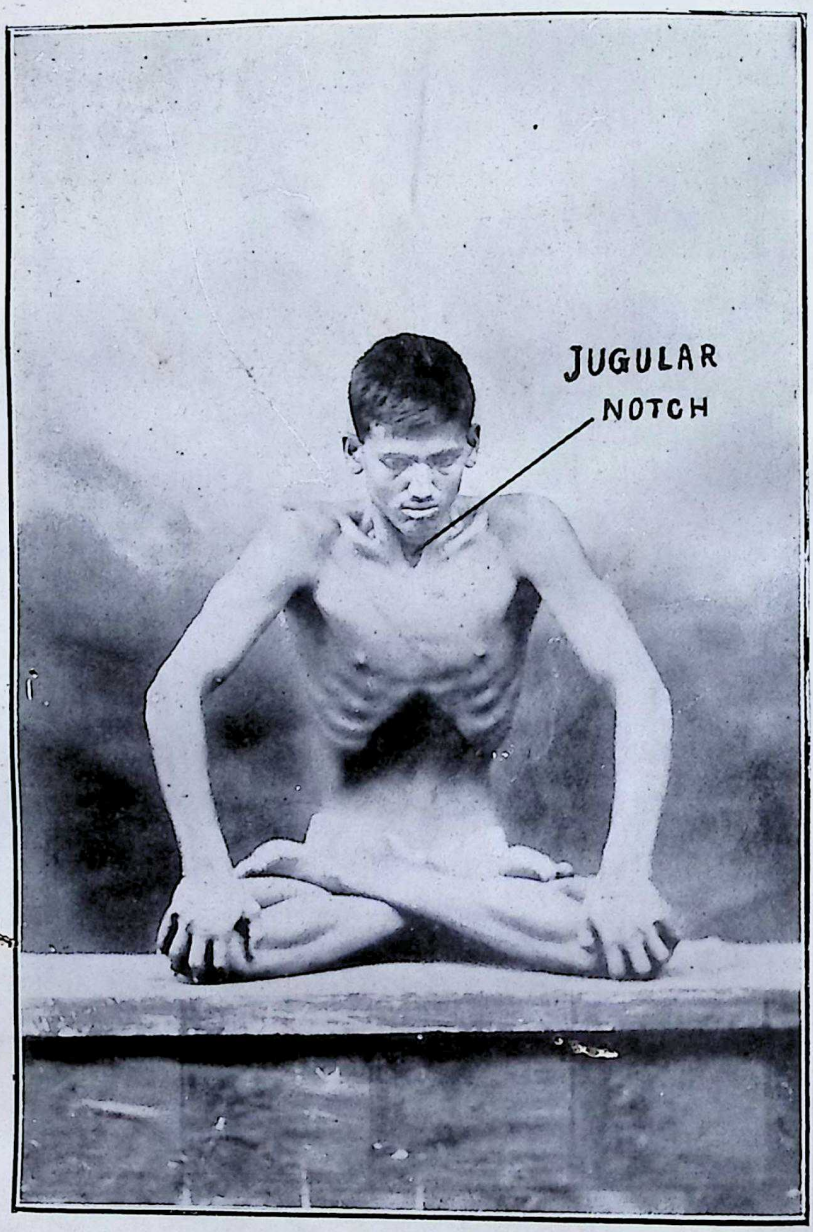
Fig. IV



Uḍḍiyâna in Sitting.

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UḌḌIYĀNA IN SITTING

THE NAME :—

This practice is called Uḍḍiyāna because the diaphragm is made to fly up from its original position and held very high in the thoracic cavity.

THE TECHNIQUE :—

The common technique has been noted on p. 9. The particular points are as follows. First the student folds his legs in a foot-lock as illustrated in Figs. XXIV and XXV. Then with the help of the rectus abdominis on the front side and the latissimus dorsi and the trapezius on the back side, he produces the concave appearance of the abdomen shown in the opposite picture. To help himself in the muscular efforts, the student stoops a little and presses his knees with his hands and gives an upward push to his whole trunk.

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POINTS OF STUDY :—

For points of study see pp. 23 and 24.

NOTE—

As this practice puts a high pressure on the heart, people suffering from heart complaints should not take to it. Even those that are suspected to have a weak heart, will do well to proceed very cautiously into the exercise. For healthy persons too, it is desirable, that the practice should start on a moderate scale. On no account a beginner should make more than three attempts a day. Uḍḍiyāna is always to be practised with an empty stomach. All this applies to the variations of this exercise shown in Figs. V, VI and VII. This and the subsequent pose are useful for the purposes of physical culture and therapeutics.

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UḌḌIYĀNA IN STANDING

THE NAME :—

For the name see p. 11.

THE TECHNIQUE :—

The student stands with his heels a foot apart from each other. His feet are turned a little outward and his legs are slightly bent in the knee-joint. He rests his hands on the knees and bends forward a good deal. For photographic purposes the student in the opposite picture is shown to hold his head high. But in practice he bends it down, so that the whole spine describes a pronounced curve. He then completely relaxes his muscles and proceeds as directed in the previous practice.

POINTS OF STUDY :—

For points of study see pp. 23 and 24.

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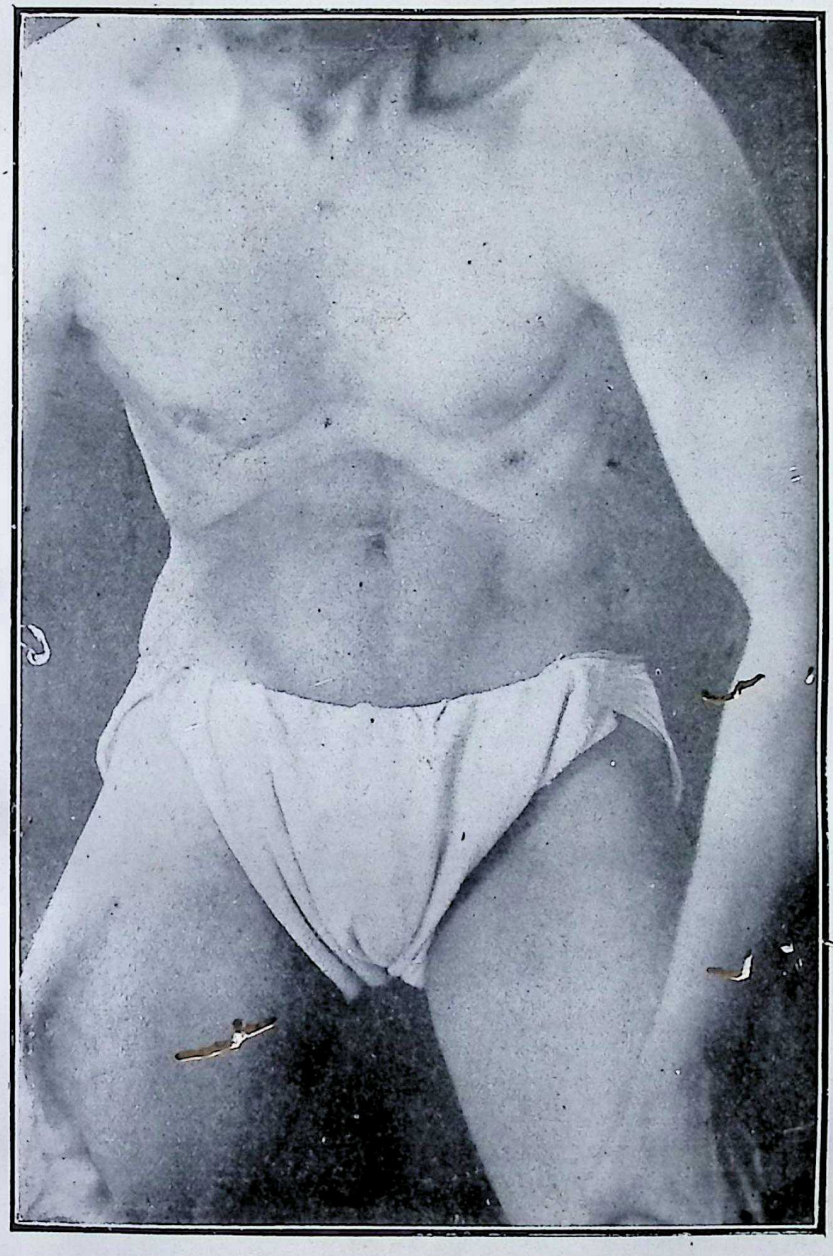
Fig. V



Uḍḍiyâna in Standing.

पुस्तकालय

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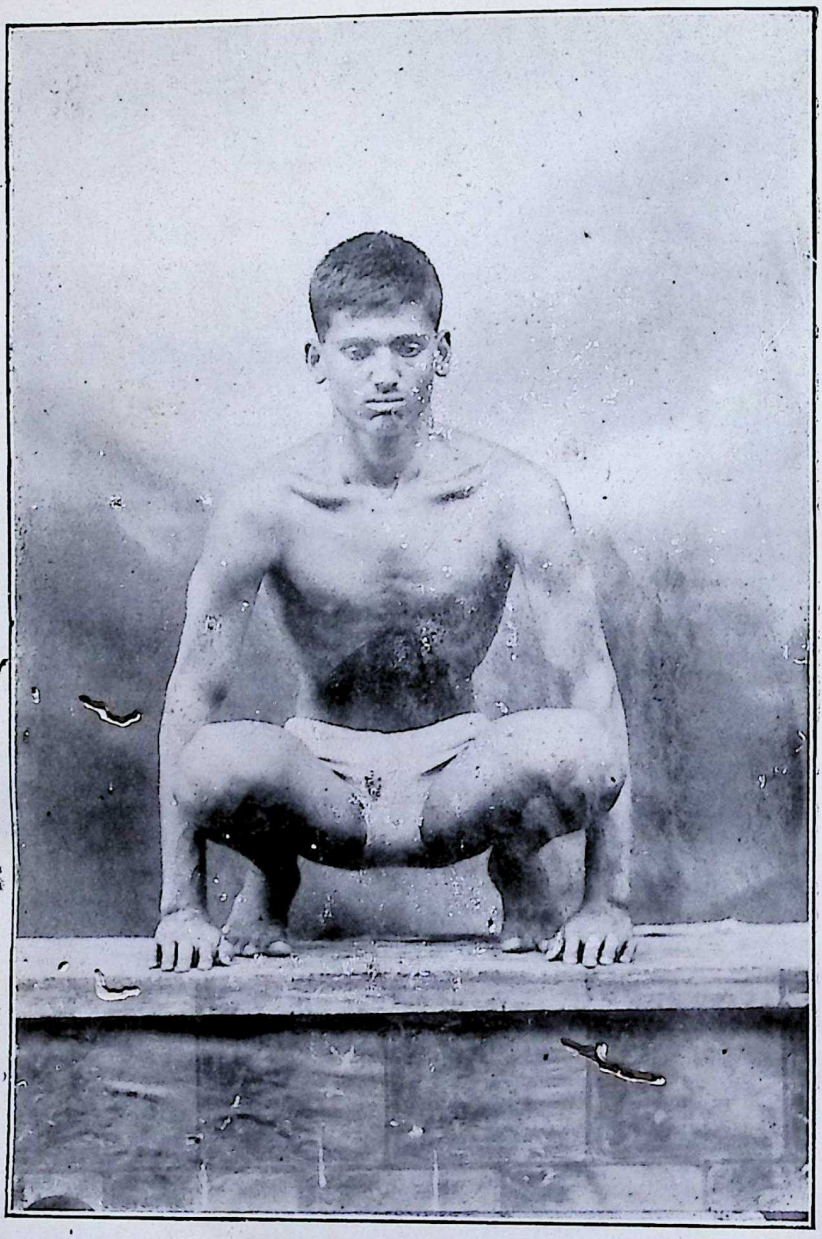
Fig. VI



Uḍḍiyâna in Squatting.

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UDDIYĀNA IN SQUATTING

THE NAME :—

For the name see p. 11.

THE TECHNIQUE :—

Here the student first sits down with his knees drawn up and his whole weight resting almost on the toes. His heels are fully raised and support his hams. He places his hands beside his toes, keeping his elbows clear of his knees as shown in the adjoining picture. It is preferable, however, to pass the arms across the knees, for the pressure of the elbows on the knees gives the student a good deal of mechanical advantage in the muscular control necessary for the practice of Uddiyāna. As in the previous illustration, the forward bent of the body has not been as pronounced in the picture as it generally is. That is because of photographic necessity. The student hangs down his head during the practice and gives a good curve to his spine, so that with the usual muscular effort the necessary concave appearance of the abdomen is produced.

POINTS OF STUDY :—

For points of study see pp. 23 and 24.

NOTE—

This practice is useful for Yogic flushing of the colon.

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UḌḌIYĀNA IN SĪRSHĀSANA

THE NAME :—

For the name see p. 11.

THE TECHNIQUE :—

First the student has to balance his body on his head as shown in the opposite picture. For this purpose he first squats on his seat and prepares a finger-lock by pushing the fingers of his right hand between those of the left till their roots are well knit together. Then in his front, he makes a convenient angle with his forearms, the finger-lock serving as the vertex. Further he places his head at the vertex so that during the balanced pose, the head may be supported from behind by the finger-lock. Now he tries to bear his whole body on the three points, the two elbows and the head. He slowly raises the lower part of his trunk; and drawing up his knees to his chest balances his body on the three points just mentioned. When he finds himself quite steady in this position he unfolds his legs and thighs and holds them in the air as shown in the adjoining picture. Afterwards with the necessary exhalation and muscular effort he practises Uḍḍiyāna.

POINTS OF STUDY :—

These will be recorded on some other occasion in this journal, along with a detailed study of the pose.

NOTE—

The practice being an important variety of Uḍḍiyāna had to be mentioned along with its other types. It has been subjected to experimentation and the results require a separate article for their treatment. It is sufficient to note here that through this exercise, the student is able to relax the levator ani and the anal sphincters and thus to open his rectum. He can thereby expel foul gases from the lower part of his colon and admit fresh air to it. It has great therapeutical advantages.

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Fig. VII

Uḍḍiyâna in Śîrshâsana.

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X-RAY EXPERIMENTS ON UḌḌIYĀNA

EXPERIMENT I

THE OBJECT OF THE EXPERIMENT :—

The object of the experiment was to study the normal position of the colon when loaded with a pint of opaque solution, with a view to contrast it with its position during the Yogic exercise called Uḍḍiyāna.

THE PREPARATION OF THE SUBJECT :—

The subject was a young man of average health who had yet to complete his teens. He was practising the two Yogic exercises Nauli and Uḍḍiyāna for the preceding six months. On the day previous to the experiment, he took his usual meal at about 12 noon. In the evening he was given only a cup of milk. He slept soundly at night and the next morning at about 6 a. m. had a clear bowel movement. The subject was not allowed to take anything till 12 noon when the experiment started. These precautions were taken for securing clean intestines. In the fluorescent screen examination conducted just before the experiment, the whole alimentary canal was found free of all opaque contents. In Radiographs I and II, though the colon appears to have cast dark shadows on account of the injected liquid, the small intestine has not done anything of the type.

THE INJECTION :—

In preparing and giving the injection, the method recommended by Haenisch for the investigation of the large intestine was followed. 500 grammes of warm water were thoroughly mixed with 300 grammes of kaolin and 150 grammes of barium sulphate. Then 500 grammes more of

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warm water and finally 150 grammes of barium were added. A douche can was filled with three pints of the solution thus prepared and was placed 5 feet high from the subject. It was fitted with a sufficiently long piece of india-rubber tubing having at the end two inches of glass tubing attached to it. This last part was connected with a soft rectal tube by means of rubber tubing again. The short glass tube allowed the flowing injection to be seen.

THE EXPERIMENT PROPER :—

Only one pint of this liquid was introduced through the rectum while the subject was lying on his back. He was immediately taken to the X-Ray couch and was made to lie there again on his back, with the X-Ray tube below. The shadows on the fluorescent screen showed that the injection had reached the splenic flexure only, leaving the remaining part of the colon free. The subject was then made to practise Nauli. The effects of this exercise on the bowel contents have been scientifically studied and will be recorded in some other issue of this journal. Here it is sufficient to note, that the practice had the desired effect and the injection at once spread upto to the cecum. Radiograph I was taken in this condition while the subject was made to lie supine on the couch.

NOTE—

The radiographs printed in this issue were all originally of 12″ × 10″. They have been subsequently reduced to 6″ × 5″ size for the convenience of this journal.

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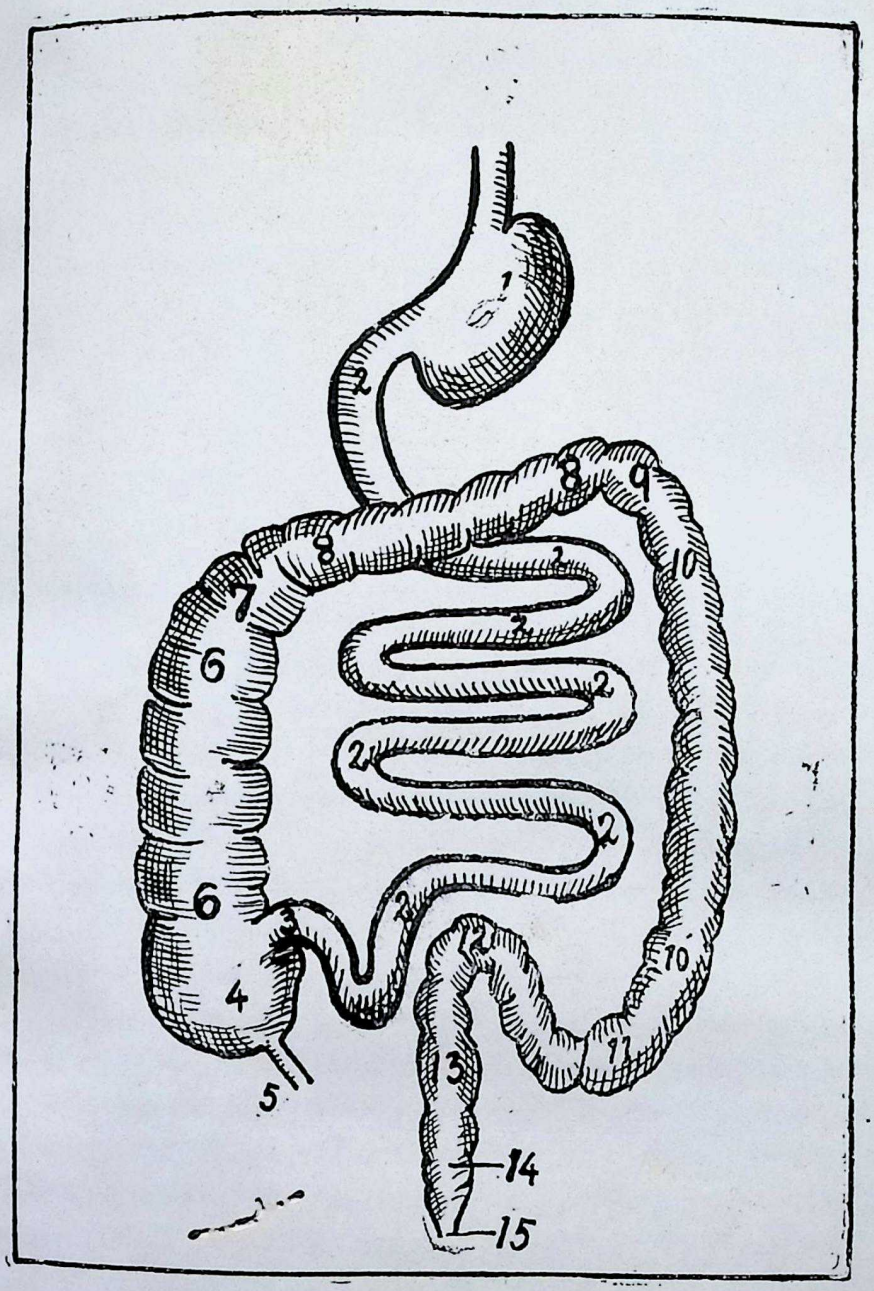
Fig. VIII



The Stomach and the Intestines.

1 The Stomach.
2 The Small Intestine.
3 The Ileo-Cecal Valve.
4 The Cecum.
5 The Appendix.
6 The Ascending Colon.
7 The Hepatic Flexure.
8 The Transverse Colon.
9 The Splenic Flexure.
10 The Descending Colon.
11 The Iliac Colon. } The Sigmoid.
12 The Pelvic Colon. }
13 The Rectum.
14 The Anal Canal.
15 The Anus.

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Fig. IX *Radiograph I*

Normal Position of the Colon
with
One Pint Opaque Injection.

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REFERENCES TO RADIOGRAPH I

1 The Iliac Bones.
2 The Sacrum.
3 The Twelfth Ribs.
4 The Twelfth Dorsal.
5_1 The First Lumbar.
5_2, 5_3, 5_4, 5_5 The Successive Lumbar Vertebræ upto the Fifth.
6 The Cecum.
7 The Ileo-Cecal Valve.
8 The Ascending Colon.
9 The Hepatic Flexure.
10 The Transverse Colon.
11 The Splenic Flexure.
12 The Descending Colon.
13 The Iliac Colon.
14 A Part of the Pelvic Colon.

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POINTS OF STUDY :—

1 — (a) The cecum is filled with the barium solution.
(b) Its shadow is darker than the shadow of the right iliac bone and is to be seen clearly against it.
(c) It is hanging as low as the fifth lumbar.

2 — (a) The cecum is divided from the ascending colon by a white patch.
(b) This represents the ileo-cecal valve which is clear of all contents and therefore casts no shadow.

3 — (a) The ascending colon is full of the barium injection.
(b) Its shadow is slightly narrower than that of the cecum.
(c) It rises as far as the middle of the first lumbar.
(d) The upper end represents the hepatic flexure which, therefore, occupies the middle level of the first lumber.

4 — (a) The transverse colon also is filled with the opaque liquid.
(b) It makes a very sharp angle with the ascending colon and is almost in contact with it.
(c) It is hanging as low as almost the middle of the fifth lumbar.
(d) Its curve is extremely pronounced.
(e) It rises at the other end till it is in level with the lower border of the twelfth dorsal.
(f) It ends in the splenic flexure which, therefore, is situated an inch above the hepatic.

5 — (a) The descending colon also is full of the barium injection, but not to the same extent as the parts noted above.
(b) It does make an angle with the transverse colon, but it is not so sharp as at the hepatic flexure.
(c) Throughout its course it hangs perpendicular and is almost parallel to the vertebral column.

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6 — (a) The iliac colon and the first part of the pelvic colon have cast a darker shadow than the descending colon which shows greater concentration of the liquid in this part.

(b) Both these colons are lying stretched in a straight line, making an obtuse angle with the descending colon.

(c) They are seen clearly marked against the left iliac bone.

7 — According to the original radiograph the transverse colon is hanging as low as 7.25″ from the root of the twelfth rib.

8 — In the original radiograph the space occupied by the first four lumbar vertebræ measures 5.25″.

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EXPERIMENT II

THE OBJECT OF THE EXPERIMENT :—

The object of the experiment was to know the position of the colon during Uḍḍiyāna and to note the conduct of its contents during the same practice.

THE PREPARATION OF THE SUBJECT:—

Directly after the first experiment was tried, the subject was taken up for this experiment.

THE EXPERIMENT PROPER :—

The subject was not placed in any of the four poses shown in Figs. IV to VII, though they are the most usual postures for the practice of Uḍḍiyāna. This was because they did not suit the X-Ray arrangements. A pose, therefore, had to be selected that would best serve the radiographic needs and also would accurately represent the position of the colon during the first three poses of Uḍḍiyāna. So he was made to lie supine on the couch with the X-Ray tube moved underneath the lumbar region. He was asked to draw his legs in, bending the knees only so far as would allow a free movement of the abdominal muscles. After doing this the subject practised Uḍḍiyāna according to the usual method. The X-Ray plate was placed on the abdomen and the following radiograph was taken.

NOTE—

While the plate was being exposed the subject relaxed his hold upon the left side of his abdomen. The accompanying radiograph, therefore, represents the position of the colon in this condition and not in a well controlled Uḍḍiyāna. Had this plate not been of a high therapeutical value, it would not

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have been produced here. The fluorescent screen observations of a perfect Uḍḍiyāna have been recorded in a supplement attached to this experiment. It will be seen that only the points of difference have been noted and that these refer to the colon below the splenic flexure.

181.45
K96Y
V.1
c.2
29929

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REFERENCES TO RADIOGRAPH II

1 The Left Iliac Bone.
2 The Twelfth Ribs.
3 The Twelfth Dorsal.
4_1 The First Lumbar.
4_2, 4_3, 4_4, 4_5 The Successive Lumbar Vertebræ upto the Fifth.
5 The Upper Fourth of the Ascending Colon.
6 The Hepatic Flexure.
7 The Transverse Colon.
8 The Splenic Flexure.
9 The Descending Colon.
10 The Iliac Colon.
11 One Anna Piece Marking the Umbilicus.

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Fig. X *Radiograph II*

Position of the Colon and its Contents
during
Uḍḍiyâṇa.

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POINTS OF STUDY :—

1 — (a) The cecum is completely emptied of all its contents.
(b) Therefore it casts no shadow.
(c) Though it cannot be seen in the present radiograph, the cecum is observed under the fluorescent screen to be considerably raised and drawn towards the vertebral column during other experiments on Uḍḍiyāna. [See also 3 — (d) below].

2 — (a) The ileo-cecal valve is not to be seen.
(b) It did not allow any of the opaque liquid to be drawn back into the small intestine.

3 — (a) The lower three-fourths of the ascending colon are empty.
(b) Therefore they cast no shadow.
(c) The upper one-fourth is filled with barium.
(d) Its inclination to the vertebral column shows that the remaining three-fourths as well as the cecum must be deviating to the spine during Uḍḍiyāna.
(e) The hepatic flexure is full of barium.

4 — (a) The transverse colon is not to be seen in its proper place.
(b) From the middle of the fifth lumbar it is raised above the twelfth dorsal.
(c) The fluid from the cecum and the lower three-fourths of the ascending colon is drawn up in the transverse colon which on account of its increased contents seems to cast very dark shadows.
(d) Its angle at the hepatic flexure has altogether disappeared.
(e) It no longer makes a sharp curve folding its two parts upon one another ; but it now rises in almost a circular arch lying between the eleventh and the twelfth ribs.

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(f) The splenic flexure is full of the opaque solution.

5 — (a) The descending colon does not make an angle at the splenic flexure.

(b) It is filled with the injection but not uniformly. The concentration of the liquid increases as the colon descends.

(c) It does not hang perpendicular but is drawn towards the spinal column.

6 — (a) The iliac colon has increased in capacity and appears to have drawn up the liquid, *most probably*, from the lower parts of the colon.

(b) Nothing can be seen of these lower parts in the present radiograph.

7 — According to the measurements of the original radiograph, the transverse colon appears to have risen 8″ from the middle of the fifth lumbar to the base of the eleventh dorsal.

8 — In the original radiograph the space occupied by the first four lumbar vertebræ is 5.5″, showing a clear stretch of nearly 5 per cent. due to the upward pull of the back muscles.

THE SUPPLEMENT :—

1 — The descending colon, the sigmoid and the rectum appeared to be clean. They had no contents.

2 — The whole liquid gathered in the transverse colon and the nearest parts of the ascending and descending colons.

3 — The middle of the descending colon was drawn to the spinal column to a greater degree than is represented in Radiograph II.

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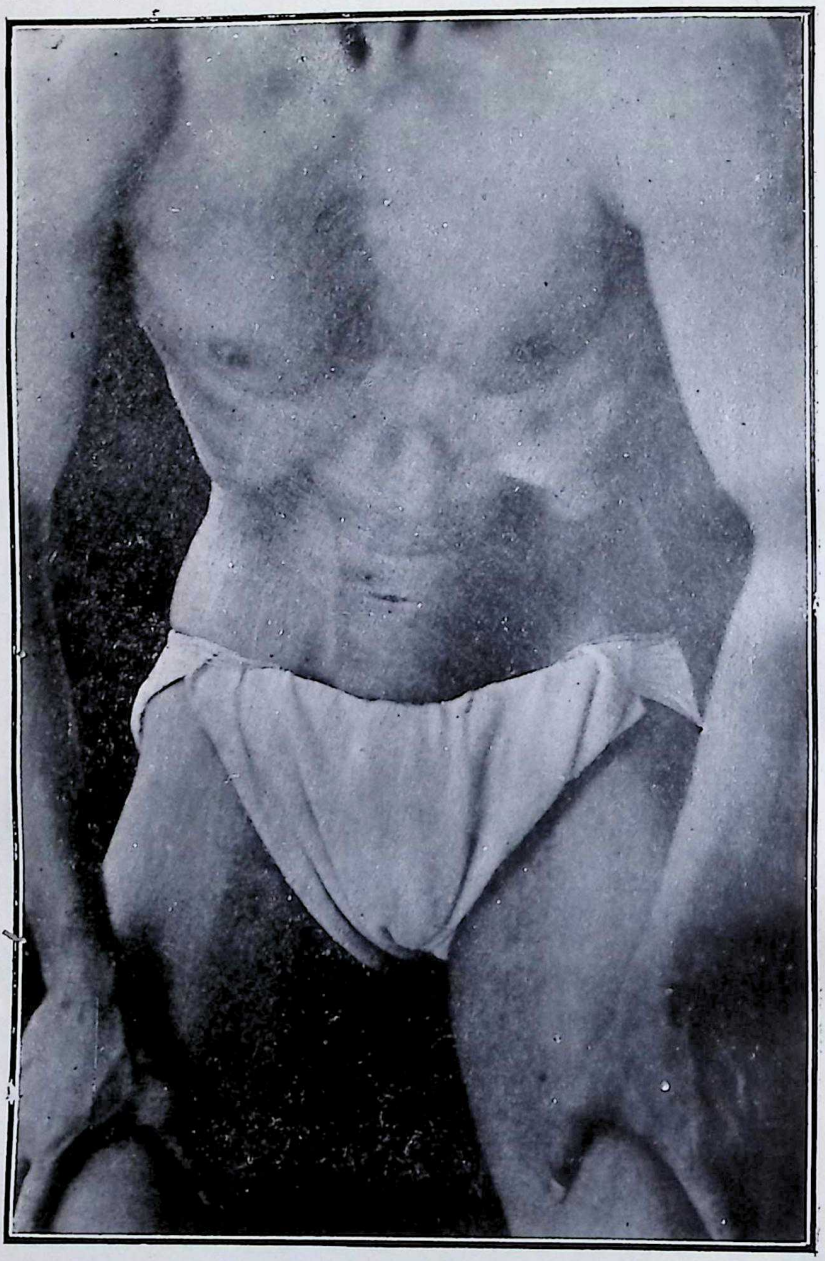
Fig. XI



Nauli in Standing.

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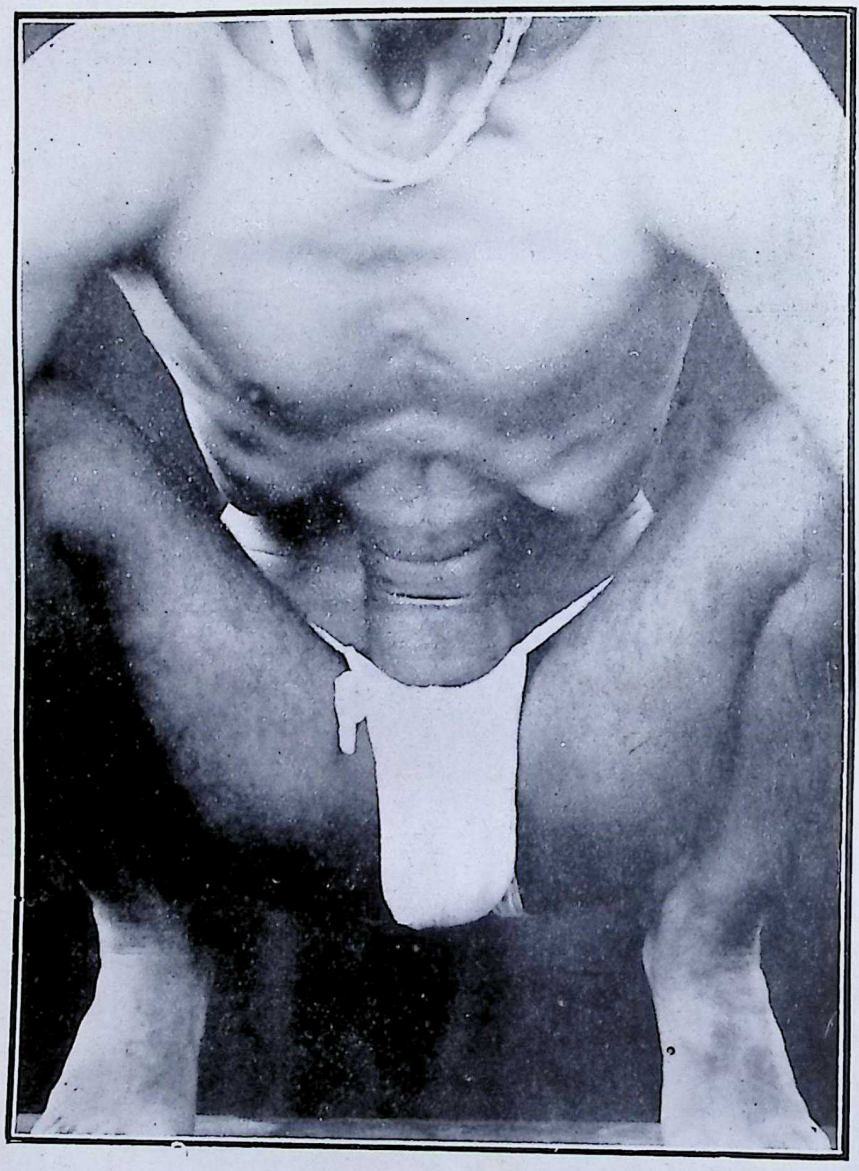
Fig. XII



Nauli in Squatting.

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WHAT IS NAULI?

NAULI is the isolation and rolling manipulation of the rectus abdominis. This definition like that of Uḍḍiyāna conveys very little sense to people that know nothing of Yoga. The denotation and connotation of the term, however, are so wide, that the readers must wait and study the various experiments that will be described in the pages of this journal, before they can fully grasp the meaning of this Yogic exercise. For a practical student of this science, however, the following description will be sufficiently useful. It will also enable a theoretical student to follow clearly the scientific discussion bearing on the exercise.

THE TECHNIQUE :—

In its performance the exercise is only a step further than Uḍḍiyāna. As it is practised in a squatting as well as a standing position, two full page illustrations are given. (Figs. XI and XII). It will be evident to the reader that these poses are the same as those shown in Figs. V and VI. Hence no description of these poses will be repeated. Only the after-Uḍḍiyāna development will be noticed.

The practice of Nauli is nearly opposite of Uḍḍiyāna at least in some respects, though the student proceeds to the former through the latter. Here the rectus abdominis is first contracted and then isolated from the abdomen. This isolation is effected by a forward thrust of the intestines backed up by a downward and forward push of the latissimus dorsi and the trapezius. The posterior part of the diaphragm also lowers down. Thus the intestines are pressed forward by the combined action of the three muscles, the diaphragm from above, the latissimus dorsi and the trapezius from behind. They are

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thus huddled up and stand bulging out under the isolated abdominal muscles. (Vide Figs. XI and XII). In these pictures the two straight muscles of the abdomen stand side by side in the middle; whereas in Fig. XIII the rectus abdominis is rolled off to the extreme left and in Fig. XIV to the extreme right. All these rolling manipulations are included in Nauli.

POINTS OF STUDY :—

There are a number of points which deserve to be studied in the case of Nauli. Out of these only one has been singled out for this issue. The question of sucking up water through the rectum by Nauli, is to be discussed here.

NOTE—

The caution given to persons of weak hearts in the practice of Uḍḍiyāna, applies to them in this practice also, as it puts the same amount of strain upon the viscera. The standing pose is of general utility whereas the squatting pose is used for the Yogic flushing of the colon. A constant practice of this exercise gives full control over the rectal muscles, so that the organ can be forced open and water drawn into the colon through it. This Yogic flushing of the colon is called Basti. It will be dealt with in the next issue of this journal.

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Fig. XIV

The Rectus Abdominis Rolled to the Right.

Fig. XIII

The Rectus Abdominis Rolled to the Left.

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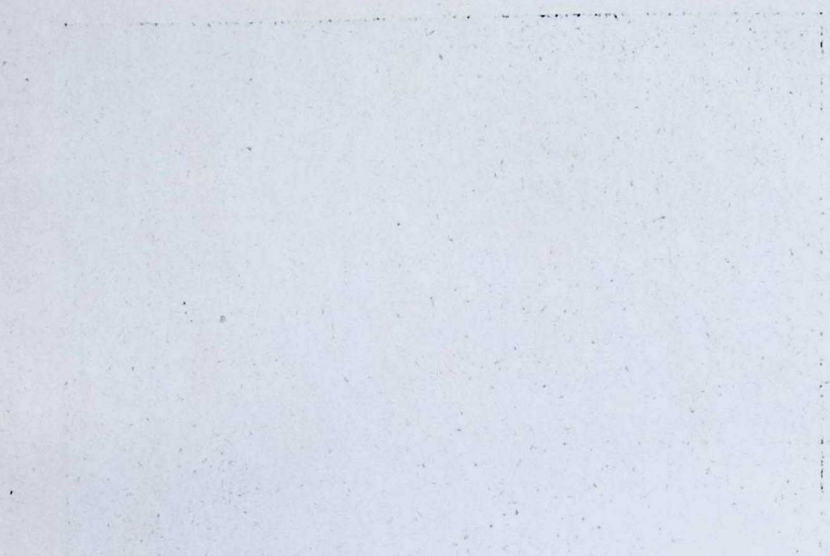

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BAROMETRIC EXPERIMENTS ON NAULI

THE DISCOVERY OF A PARTIAL VACUUM[1] IN THE COLON IN NAULI

EXPERIMENT I

THE ANTI-PERISTALSIS HYPOTHESIS :—

On account of the many prejudices entertained by men of science towards Yogic culture, the exercise of Nauli never engaged their serious attention. That Nauli enabled a student of Yoga to raise water into the colon without any external mechanical help, was known to many; but they had their own way of explaining away the thing. They put forth the anti-peristalsis hypothesis. It was argued that by the practice of Nauli, anti-peristaltic action could be started in the rectum and the anal canal which when in contact with water, sent back a current of it through the colon. No one cared to collect any experimental evidence for this proposition which remained, therefore, merely a matter of speculation. Had a man of science taken up the problem seriously, he would have arrived at the same conclusions as ourselves.

The hypothesis, as it stood, had a highly dangerous import for Yoga. The anti-peristaltic action is unnatural in the rectum. If it develops there, it leads to serious constipation and to the consequent state of auto-intoxication. The practice of Nauli is advised in Yoga as a daily programme. Now according to this hypothesis if a Yogic student took to this daily programme, he would in course of time suffer from the fatal consequences of self-poisoning. Thus the modern view stood in direct opposition to the old view which looked upon Nauli as a curative exercise for constipation and auto-intoxication.

[1] As this section has already become disproportionately lengthy, the full discussion on this point is reserved for the next issue, only a passing reference to it has been made here.

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We could not take the hypothesis on trust, especially because it contradicted the experience of ages. We directly went to the laboratory for a study of the problem and soon found a number of scientific absurdities in the hypothesis. Only one will be stated here.

THE ABSURDITY OF THE HYPOTHESIS :—

A beginner in Nauli is not able to open his rectum through muscular force. So he is advised the use of a rectal tube of 4". It is to be partially introduced into the rectum for the purposes of colon-flushing. With the help of Nauli water is drawn into the colon through this rectal tube.

Now, if anti-peristalsis were responsible for the rise of water, no current could flow through the rectal tube wherefrom the action is totally absent. But the fact that it does flow proves that the hypothesis is absurd.

THE DISCOVERY OF A PARTIAL VACUUM :—

The phenomenon of the rise of water had to be explained. One day it suggested itself to us that the rise of water into the colon must be due to the same reason as the rise of water into a water-pump, both being caused by partial vacuum created inside the tube. On trying the following experiment with the barometer, we discovered this vacuum which out of deep reverence to our Master, we have named after him as *Mâdhavadâsa Vacuum*.

THE EXPERIMENT PROPER :—

A syphon barometer was selected for this purpose. The free end of this was connected with the colon by means of an india-rubber tube passed through the rectum. As soon as the muscles were moved for Nauli, the mercury fell through 40 mm. indicating a clear partial vacuum. The experiment was often repeated on other occasions, and every time a partial vacuum of 30 to 47 mm. was indicated according to the cleanness of the colon.

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पुस्तकालय
गुरुकुल काँगड़ी

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His Holiness Paramahaṁsa
Śrîman Mâdhavadâsa Mahârâja
of
Mâlasara.

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THE PARTIAL VACUUM

in the colon during Nauli is named

MĀDHAVADĀSA VACUUM

after his

Master

His Holiness Paramahansa

Śrīman Mādhavadāsa Mahārāja

of

Mālasara

BY

the humblest of his disciples

KUVALAYĀNANDA, THE DISCOVERER.

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The Semi-Scientific Section

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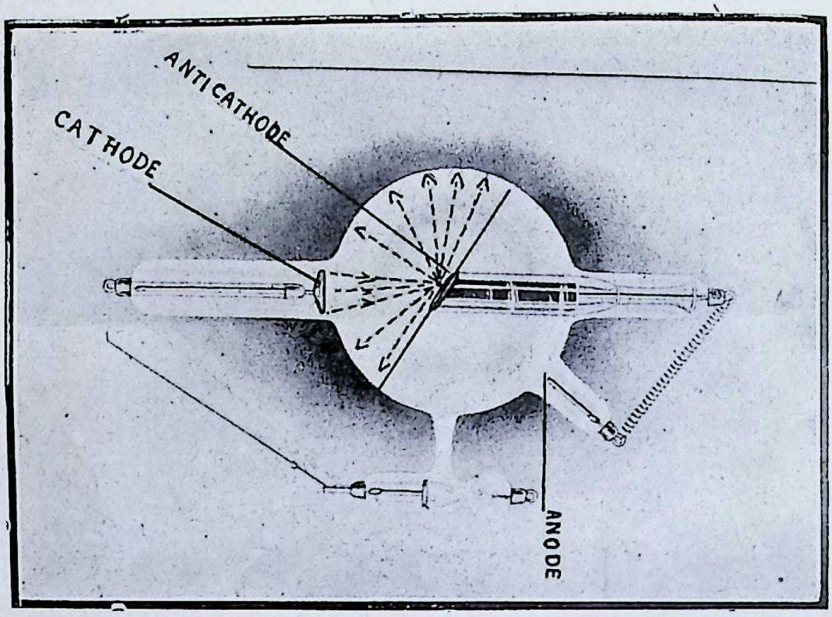
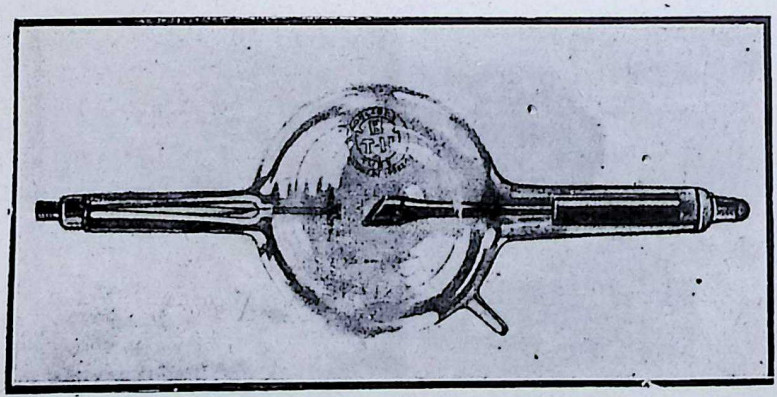
Fig. XIVa



Müller Special Heavy Anode Tube.

Fig. XIVb



The Coolidge X-Ray Tube.

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A NOTE ON THE X-RAYS

Setting aside all scientific details and technicalities, it may be at once stated that the X-Rays are produced by means of an electric current passed through a vacuum-tube. This tube is made of glass with arrangements to pass an electric current through it and is very highly exhausted of air. Two typical tubes have been shown in Figs. XIVa and XIVb.

The wire through which the current enters the tube is called the *anode*, and that by which it leaves the tube is called the *cathode*. The electric current while leaving the tube makes the cathode emit rays shooting in straight lines. These are called the *cathode-rays*. A stream of these has been shown by dotted lines in Fig. XIVa as flowing from the cathode. Here the cathode is made in the form of a concave mirror and hence the rays do not run parallel but converge at a point in the middle of the tube. Just at the point where they all meet, they are made to strike a plate of some hard metal such as platinum, tungsten, etc. This plate is called the *anti-cathode*. Now whenever the cathode-rays in a very highly exhausted tube strike on any surface, it is their property to give rise to a new type of rays that are more penetrating than themselves. These are the famous X-Rays, also known as *Röntgen Rays* after their discoverer. In Fig. XIVa, they have been shown by dotted lines diverging from the anti-cathode. The X-Rays are not, however, visible by themselves.

But if these invisible rays strike particular substances, the latter become illuminated with a fluorescent glow. One of these substances is platino-cyanide of barium. A piece of cardboard is evenly covered with a paste of this and is fixed on a wooden frame. If this be held up in front of the X-Ray tube, it glows with a peculiar yellow-green illumination, especially in the dark. Such a cardboard is called the *fluorescent screen*.

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The penetrating power of the X-Rays differs very widely from that of the sunlight. Many substances that are opaque to sunlight are transparent to Röntgen Rays. Thus the Röntgen Rays will pass through a piece of wood and even a brick, though the sunlight cannot. They are, however, held back by most metals. A piece of nickel coin will not allow the rays to pass through it. Now whenever rays are obstructed by an article, the article casts a shadow showing itself up on the lighted surface opposite to it. Thus if a book is held in the sunlight, it will cast its shadow on the ground below. The sun-rays cannot pass through it. But if the same book is held between the X-Ray tube and the fluorescent screen, the screen will glow as if nothing was held between it and the tube, because the X-Rays can pass through the book without any obstruction. A metallic rod, however, will at once show itself up on the fluorescent screen.

Now it is found that the various parts of the body behave differently to the Röntgen Rays. The softer parts are transparent whereas the harder ones are opaque. The bones are more or less opaque while flesh and fat are transparent. If then, the hand is held up between the tube and the screen, the bones will cast a shadow; but the remaining parts will allow the rays to pass which will go straight to the screen and set it glowing. In this way all the bones of the hand will be figured clearly on the screen. The heart is a muscle. But it is so strong that it holds back the X-Rays to a considerable extent. Hence it is possible to watch its work on the screen. The intestines are transparent to the X-Rays. It is, therefore, necessary to administer an opaque meal or enema, if their movements are to be watched on the screen. The fluorescent screen, however, affords no opportunity of preserving its shadowy record. For this purpose photographic plates are required to be substituted. X-Rays affect these plates just as the sunlight does. Hence the shadows become fixed on the plates

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which can be afterwards developed in the ordinary way. Röntgen Rays photographs are called *radiographs*.

For the purpose of radiography or screen-examination, a wooden couch is used. The working tube is placed underneath this couch. Wood is transparent to the X-Rays and the couch is no obstruction to their work. The person to be examined lies on the couch with his clothes on, for the clothes too do not keep the rays back. Then the fluorescent screen or the photographic plate is placed on that part of his body which is to be examined. In this position the shadows can be most conveniently watched on the screen or fixed on the plate. In the present number Figs. IX and X represent two different radiographs.

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THE ANATOMY OF THE COLON

We introduce food into our body everyday. The system takes up those portions of it that are useful to it for its work and excretes the remaining. While in the body, food has to pass along a particular path called the *digestive tube* (alimentary canal). It is about 30 feet in length extending from the mouth to the anus. Roughly speaking the tube is divided into seven parts. The mouth, œsophagus, stomach, small intestine, colon, rectum, and anal canal. The small intestine and also the large which consists of the last three parts of the digestive tube, are situated in the abdominal cavity. In this note along with the anatomy of the colon, a few words will be said about the rectum and the anal canal. (Vide Fig. VIII).

The colon consists of the cecum, the ascending colon, the transverse colon, the descending colon and the sigmoid. This last joins the rectum which extends into the anal canal. The calibre of the colon is largest at its commencement at the cecum and gradually diminishes as far as the rectum. The colon is about 5 feet in length, and 1·5 to 3 inches in diameter. In its course the colon describes an arch which surrounds the folds of the small intestine. The small intestine joins the colon by means of the ileo-cecal valve, an inch and a half above its commencement.

The cecum is the beginning of the colon. It consists of a pouch much broader than the rest of the colon, and is lodged in the hollow of the right iliac bone. (Fig. IX). It is situated below the level of the ileo-cecal valve and to it the important little organ, the appendix, is attached. The cecum enjoys a considerable amount of movement. The appendix is a long, narrow, worm-shaped tube which starts from the lower end of the cecum. It varies from 1 to 7·5 inches in length. A small canal runs through this tail of the cecum and communicates with the main body through an orifice.

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No. 1]

The ascending colon begins at the cecum and rises along the right abdominal cavity to the under surface of the liver. Here it takes an abrupt turn to the left and forms what is called the *hepatic flexure*. At this point the capacity of the colon is very much reduced.

But the calibre of the colon improves as it proceeds onwards and reaches the lower end of the spleen. Here it curves sharply on itself and forms what is named the *splenic flexure*. From the hepatic to this flexure the colon is called the *transverse colon* and lies in an arch reaching the umbilical region of the abdomen. The splenic flexure is situated at a higher level than the hepatic. Its angle is so acute that the end of the transverse colon usually lies in contact with the front of the descending colon. Here also the tube is very narrow.

The descending colon begins at the splenic flexure and sinks as low as the hip-bone. It crosses the left border of the abdominal cavity and ends in the sigmoid.

The sigmoid colon consists of two parts: the *iliac colon* and the *pelvic loop*. The iliac colon is lodged in the hollow of the left iliac bone and the pelvic loop lies in the pelvic cavity. The sigmoid colon ends in the rectum. Though fixed at the two ends with the descending colon and the rectum, the loop enjoys a considerable range of movement in its central portion. When it is full it rises out of the pelvis into the abdominal cavity and forms a curve; but when it is empty it sinks into folds lying flat upon the rectum.

The rectum lies between the ends of the sigmoid colon and the anal canal. It is generally 5 to 6 inches in length. At the commencement, it is as narrow as the sigmoid; but near its termination it is dilated. There are certain transverse folds in the rectum, which are known as Houston's valves.

The anal canal is the last part of the colon. It lies between two circular muscles called the internal anal sphincter

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and the external anal sphincter. The latter forms the anus. The anal canal is something like an inch in length. These sphincters are generally closed, but they open at the time of defecation.

The colon is a muscular tube and throughout its course is covered with two layers of muscles. The internal layer consists of circular muscle fibres whereas the external one is composed of fibres running lengthwise.

The nerves are derived from the second, third and fourth sacral nerves; and from the sympathetic through the pelvic plexuses. (Fig. XVII). They act not only through the central nervous system but also independently of it. Some of these nerve fibres terminate in the colon just above the internal anal sphincter and form what are called *papillæ*. These centres have a great physiological value.

A biological survey of the colon has proved that the carnivorous animals have a short colon, whereas the colon of the herbivorous animals is long. There are physiological advantages in this arrangement of Nature. If the useless residues of a flesh diet are not speedily discharged from the body, they would putrefy and develop dangerously active poisons. For this reason the colon of the flesh-eating animals has been made short. But the residue of a vegetable diet ferments and produces acids which help the bowels in their movement. So it is desirable that the residue should be delayed in the colon for a time. To secure this delay the colon of the herbivorous animals has been made long. Looking to the length of the colon, one is convinced that the only diet natural for man is the vegetarian.

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THE PHYSIOLOGY OF THE COLON

The principal function of the colon is to receive unusable and waste matters from the small intestine and to discharge them. The ileo-cecal valve is the gate through which the contents of the small intestine are pushed into the cecum. Thence they are conducted to the end of the anal canal finally to be excreted from the body.

The ileo-cecal valve is composed of a circular muscle with lips projecting into the cecum. When the contents of the small bowel are presented to this valve for being thrown into the large intestine, it opens only if the food-stuff is fully digested and the absorption of the digested material is nearly complete. If these processes are yet to go on, the sphincter remains closed till they are nearly finished. Thus when the contents are thrown into the cecum, they are almost devoid of any material that can be useful to the system.

The matter discharged by the ileo-cecal valve is nearly in a fluid condition, being ninety per cent. liquid and only ten per cent. solid. The solid part mainly consists of indigestible food-residues, waste products of the liver and the mucous membrane, and the bacilli produced in the last part of the small intestine. The liquid portions are to be absorbed and the solid contents are to be pushed forth. For these purposes, the colon undergoes various movements which are briefly noticed below.

One of these movements is the *peristalsis*. This consists of a wave of contraction preceded by a wave of relaxation travelling down the colon. The contraction squeezes the contents of the tube before it and thus pushes them forward through the relaxed parts. The relaxed parts, in their turn, contract afterwards, and give a further push to their contents. Thus the whole stuff is carried, bit by bit, from one end of the colon to the other.

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The process of absorption, though it is nearly completed in the small intestine, has one-sixth of its part to be finished in the cecum and the ascending colon. These organs are abundantly provided with the absorbent vessels. But to facilitate the work of absorption, it is necessary that every portion of the bowel-contents is presented to their walls. Now if the peristalsis were to be the sole movement, a column of the contents would be pushed down the cecum and the ascending colon once for all. In that case only the external portions of the column would be presented to the intestinal walls and absorbed; but the internal portions would get no such opportunity. Hence this portion of the colon is provided with another movement called *anti-peristalsis*. This is the reverse of the peristalsis and pushes back the fecal matter.

Thus the two opposite movements constantly going on push the bowel-contents backward and forward till the necessary absorption is completed.

But there is a third movement which is perhaps the most useful for mixing up the different portions of the food-stuff, so that every part of it may be presented to the intestinal walls for absorption. This is the *pendulum movement*. Under the action of this movement the bowel-contents are divided into small segments, which then join together to form longer masses, these being in turn again divided. Thus every time new portions are presented to the absorbent vessels for their work.

Under normal conditions all the three movements cooperate and enable the cecum and the ascending colon to functionate properly. But in unhealthy states they fail, allowing the contents to accumulate and putrefy. Then highly dangerous poisons are produced from the putrefying matter and are slowly absorbed into the system causing various diseases.

By the time the bowel-contents reach the transverse colon, their consistency is greatly increased. Henceforth the peristalsis

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is mainly responsible for their conduct. It slowly takes them through the splenic flexure, the descending and iliac colons; and deposits them in the pelvic loop. Fecal matter takes nearly six hours to reach the pelvic loop from the ileo-cecal valve. But here it has to stay for about six to eight hours.

When empty the pelvic colon is lying folded on the upper end of the rectum. As portions of matter pass the iliac colon, they slowly fill these idle folds of the last part of the colon. As it fills, the pelvic loop rises, by degrees, in a curve till it stands on the pelvic ground like an arch projecting into the abdominal cavity. When the accumulation is sufficiently large to be discharged, a very strong peristaltic wave starts in the descending colon forcing its contents downwards. The pelvic loop also contracts and squeezes some of its matter into the rectum. These portions of the fæces stimulate the defecating centre, the anal sphincters are relaxed and opened, and the left half of the colon is emptied of all its contents.

These actions of the bowels are helped by the adjacent muscles. The diaphragm lowers down upon the intestines with a great force and the abdominal muscles press upon them tightly. This external pressure adds to the stimulation of the intestines and is necessary for their satisfactory work.

The practice of resisting the call of nature for evacuation is fraught with dangerous consequences. The nerves responsible for defecation are repeatedly stimulated into action and are soon exhausted. After a time, they refuse to act. When this practice becomes a habit, it leads to constipation.

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CECAL CONSTIPATION

PART I

ONE of the functions of the intestines is to conduct the unusable food residues to the other end of the alimentary canal and to discharge them from the body. For various reasons which will be noticed on some other occasion, the bowels are not able to perform this function satisfactorily, with the result that the fecal matter accumulates at different centres. This condition is called constipation. In the popular mind there is, at times, a confusion between this condition and the condition known as indigestion. But the two are quite distinct from each other in their nature. The digestive tube secretes different juices as the food passes along it. These juices act upon the food and render it capable of being absorbed into the system for its maintenance and growth. This process is called digestion. As this process of digestion and absorption chiefly goes on in the small intestine, indigestion is a disease of this part of the food-tube; but constipation is a disease mainly of the colon. Very often the two conditions of constipation and indigestion go together. But constipation may exist even without indigestion. This happens when a healthy man takes to an exclusively milk diet. In this case the fecal matter is very small in quantity while the bowels require a larger quantity for their movement. Hence the fæces are not discharged and constipation follows as a consequence.

The aim of this article is to study the effects of the fecal matter delaying in the cecum, that is to say, of cecal constipation; and to see how Yoga proposes to cure it. The modern world has devised various remedies against this disease. A reference to these will first be made with a view to see how the Yogic methods compare with the modern ones.

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No. 1]

When food-stuffs linger in the different parts of the bowels, they begin to undergo a destructive change as a result of the action of germs upon them. Starches and sugars ferment while proteins putrefy. The products of fermentation are acids which are harmless; but the products of putrefaction are poisons some of which are extremely dangerous.

Now of all the intestinal parts, the cecum affords the most favourable conditions for putrefaction. The putrefactive bacteria thrive best in liquid food-stuffs. The food residues as they are discharged into the cecum, are ninety per cent. liquid. Again these bacteria are helped in their growth by poisons that are originally present in the matter thrown out by the ileo-cecal valve. The liver discharges into the intestines a very large quantity of bile which is a highly poisonous substance. A part of it is used in digestion; but the remaining is to be thrown out of the body. During cecal constipation, large quantities of bile accumulate in the cecum. Just as the liver secretes bile, the mucous membrane of the intestinal walls secretes highly active poisons and throws them into the food canal to be ultimately expelled from the body. But the cecum being constipated does not allow these poisons to pass on. To this accumulation are added the secretions of the neighbouring glands. Thus the great liquidity of the cecal contents and the presence of the poisons eliminated by different organs, lead to rapid putrefaction. This condition is made worse if portions of unabsorbed proteins are present in the cecum.

As a result of this increased putrefactive activity, deadly toxins are developed in the cecum. Now this part of the colon is provided with numerous absorbents. Through these the new toxic products are absorbed into the system; and poison the different organs rendering them incapable of performing their own functions. Thus the liver and the kidneys are broken down and allow the toxic products to accumulate in the body. Slowly the whole system is poisoned and chronic diseases establish themselves permanently in the body. These

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poisons are not absorbed only from cecum, however. The lower end of the small intestine is not cut off by any bacteria-proof barrier from the cecum in which putrefaction is constantly going on. It has been experimentally shown that small particles suspended in water, soon reach the stomach when injected into the rectum. So the micro-organisms from the cecum are able to work up their way above the ileo-cecal valve, even against the downward peristaltic movement of the small intestine. Thus the cecal poisons spread all over the alimentary canal and are absorbed through all its parts.

In this way the whole system is poisoned with its own toxins. This state is called auto-intoxication. Dr. Kellogg gives a very long list of diseases resulting from constipation. According to him, headache, loss of appetite, coated tongue, appendicitis, malaria, insomnia, nervous exhaustion, dropsy, chronic rheumatism, tuberculosis, etc. are all due to constipation. Many women supposed to be suffering from disorders peculiar to their sex, are really suffering from the effects of toxins habitually absorbed from the colon in general and the cecum in particular.

This will show how dangerous an organ the cecum is. The remaining parts of the colon are also dangerous, though not to the extent of the cecum, because they are also liable to constipation.

Is there no way to get rid of the tyranny of this dangerous structure? Modern surgery, that wonderful achievement of the Western medical science, would return an emphatic 'yes'. Dr. Arbuthnot Lane, Head Surgeon of Guy's Hospital, London, has actually devised and put into practice the operation of short-circuiting (Fig. XV); and the still more radical operation of excision of the colon. (Fig. XVI). But here the question arises, whether the organ is *really superfluous* so that it can safely be dispensed with and the organism made the better for the loss? Expert opinion is distinctly divided on the point. The following observations of Dr. Keith, of the Royal College of Surgeons, England, deserve attention.

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Fig. XVI

The Whole Colon Cut off.

Fig. XV

Half the Colon Cut off.

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No. 1].

"To anatomists who knew that the great intestine was an intrinsic part of every air-breathing vertebrate, that it reached a high degree of development and specialization in every animal that included a vegetable element in its diet, that in all the animals immediately allied to man his contemporaries and his very ancient predecessors the great intestine was shaped, arranged and developed as in him, *the conclusion that the human great bowel was a useless structure* seemed a flat contradiction of *every law applicable to the human body*. It is hard to believe that a great structure that has served that long chain of ancestors carrying man's lineage through the secondary and tertiary periods of the earth's formation and assisted man to become the dominant, and universal species of the world, should suddenly fail him."

When doctors differ, it is always desirable for a layman to err on the safe side. It is better for the man to be with the colon than to be without it. Then must he die for this dangerously noble prehistoric heritage of his? No man need die for the possession of his colon, if he only knew how to make use of it. Physicians who have made a lifelong study of the colon in its pathological conditions, have come to the conclusion that a surgical operation is very rarely indicated, as in almost all the cases auto-intoxication can be successfully tackled by mild methods. Dr. Lane himself, in his most recent recommendations would advise internal medical treatment before surgery was thought of. The practical utility of these operations is almost completely discounted when the universal spread of constipation and self-poisoning in the civilized countries is taken into consideration.

Next to surgery comes the claim of purgatives and laxatives in the treatment of the disordered colon. But as the sober medical opinion is ranging itself against them, a passing reference to their evil effects is sufficient for the purpose of this article.

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All purgatives and laxatives are irritating. They are administered through the mouth; and before they reach the cecum, they have to pass through the stomach and the whole length of the small intestine. Now these parts are irritated for nothing, because the disease lies at the other end of the digestive tube. Again these drugs though they may give a temporary relief, render the whole alimentary canal weaker every time they are taken by the patient. The Yogic tradition never looked upon these with favour and it is a lucky circumstance that the modern medical world has begun to set them aside.

To-day the medical man is inclined to think that the best method of treating the ill-functioning cecum and consequent diseases, is the use of the enema. He would also recommend some muscular exercises aided by mechanical helps. In addition to these he might prescribe regulation of diet to aid the bowel movement.

In acute conditions of diseases, the modern enema is a wonderful help and may be said to be almost indispensable. But as a preventive measure and as a remedy against chronic disorders, it has serious disadvantages. In order to cure chronic states of auto-intoxication as well as other chronic diseases, a constant use of this appliance is needed. In a short time bowels get into the habit of yielding only under a particular pressure and then for creating that pressure the enema becomes a lifelong companion. But the trouble does not end there. Large quantities of water continue to distend the intestine and weaken its strength. Its elasticity and natural functioning power is on the wane. As pointed above, the cecal constipation is the most dangerous. But water introduced by the enema very often fails to reach this pouch; and even when it is made to reach there, by a large influx of the liquid, it remains in the cecum to be absorbed by its walls, as the sluggish bowels evacuate only a part of the injected water.

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No. 1]

The J. B. L. Cascade of Dr. Tyrrell that has been so widely advertised in American magazines and so enthusiastically recommended by the physical culturists of that country *may be more comfortable* than the ordinary enema; but it can hardly be said to have any therapeutical advantage over the latter as the physiological actions in both the cases are the same.

The muscular exercises prescribed by modern scientists are superficial and can only help patients in the early stage of their disease. Some of the mechanical treatments are much better; but they have the disadvantage of not being within the reach of everybody, as they are very costly.

Thus it will appear that the remedies suggested in modern times against the cecal constipation, suffer from various disadvantages. The cures should be such as would enable the constipated patient to empty his cecum completely and to throw the foul putrefying matter out of his body. The use of the cures should strengthen the cecum and not weaken it. They should be within the reach of everybody whether rich or poor. All these advantages are combined in the Yogic cures, Uḍḍiyāna and Nauli, as will be clear from the X-Ray experiments given in the Scientific Section. For the purposes of this section, however, the therapeutical application of these exercises to constipation requires to be explained. This will be done in the second part of this article. The use of the milk regimen as a remedy against constipation, will also be discussed there.

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N. B. — Instruction in Yogic culture higher as well as lower will be given gratis at the Ās'rama to everyone that earnestly seeks it.

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The Popular Section

Y. 7

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N. B. — The Director of the Kaivalyadhāma entreats every man of means to show his active sympathy for the Ās'rama.

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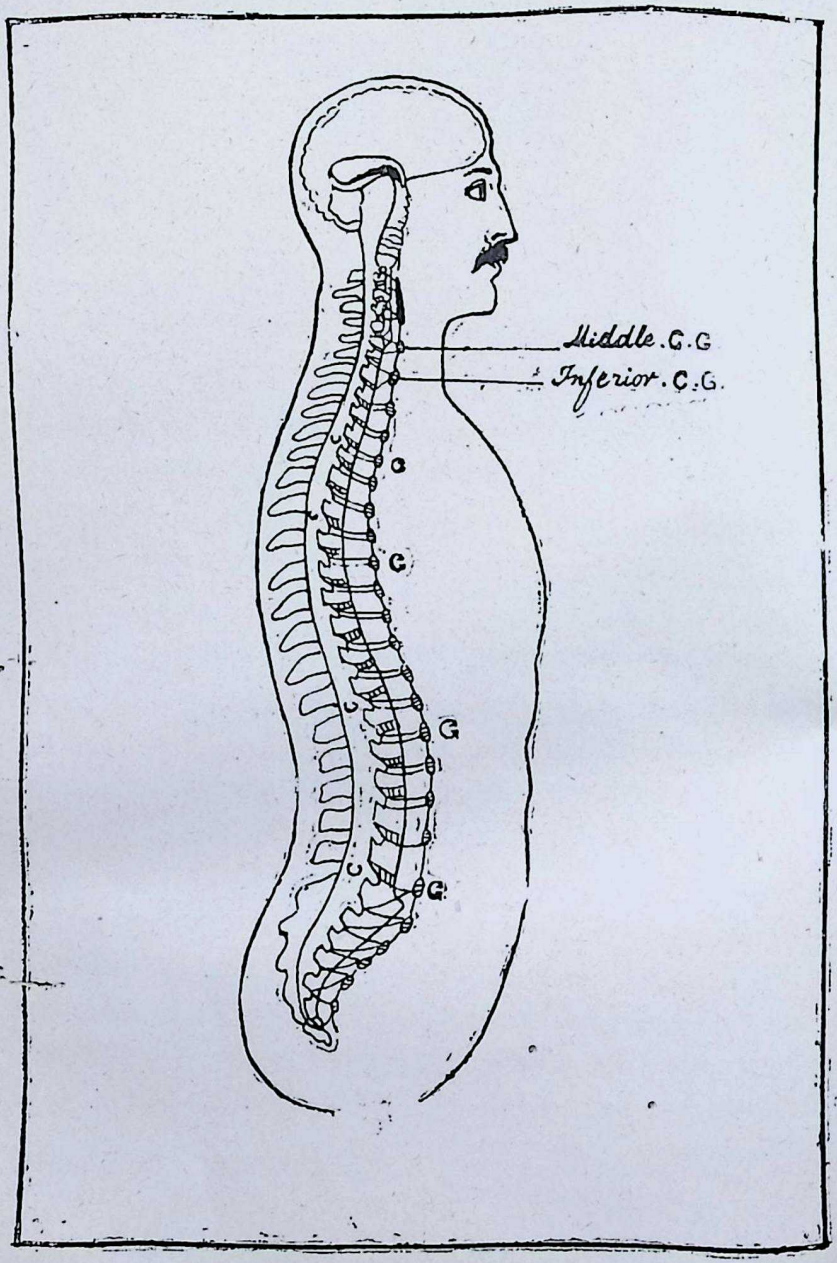
Fig. XVII



The Vertebral Column
and
The Nervous System.

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THE VERTEBRAL COLUMN

and

THE NERVOUS SYSTEM

The Vertebral Column

The vertebral column originally consists of 32 separate pieces of bones, each piece being called a vertebra. In the adjoining illustration they are marked with Roman figures. The reader will discover that they are only 26 because several of them have become fused together as they do in the case of an adult. The first seven vertebræ are situated in the neck and hence are called *cervical*, from cervix: the neck. The twelve that follow are located in the region of the back and are, therefore, named *dorsal*. The next five are called *lumber* because they support the loins. Below these is the *sacrum*, originally consisting of five bones but afterwards of one continuous piece, the separate parts being united. The last piece is the *coccyx*.

These vertebræ are arranged one on the top of the other, so that everyone of them fits in with the one immediately above it and also with the one immediately below it, through partially movable joints. Between these vertebræ soft bony substances are placed to serve as cushions. They are called cartilages and allow free movements to the vertebræ. Strong fibrous bands called ligaments bind together these 26 separate pieces of the vertebral column. Each vertebra has a hollow ring inside it. The column is so arranged as to keep these rings one above the other, forming a canal for the spinal cord to lie in. It is, therefore, called the spinal canal. In the accompanying illustration this canal is indicated by *C*.

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The Nervous System

The nervous system consists of two divisions, the central or cerebro-spinal system and the autonomic system. The latter is subdivided into two parts, the parasympathetic and the sympathetic. The parasympathetic will not be referred to here. A short and rough description of the sympathetic and the central nervous system will be attempted.

The Central Nervous System:—

The central nervous system mainly consists of the brain, 12 pairs of brain nerves called cranial nerves (Kranion = skull), the spinal cord, and 31 pairs of spinal nerves. The 12 pairs of cranial nerves start from the brain, come out through the base of the skull, and are distributed to the different parts of the body. The spinal cord is the tail of the brain. It is in continuation with it and is lodged in the spinal canal. It extends as low as the first lumbar though the nerves issuing from it hang far below its termination. The 31 pairs of spinal nerves exit through the spaces left between every two adjoining vertebræ. Thence they reach the different organs of the body. The cerebro-spinal nerves unite the brain and the spinal cord with the various physical parts. They are associated with the functions of the special and general senses, and with the voluntary movements of the body.

The Sympathetic Nervous System:—

This is represented by two chains of central ganglia placed one on either side of the middle line of the vertebral column. In the illustration they are indicated by *G*. A ganglion (pl. ganglia) is a mass of nervous substance which serves as a centre of nervous influence. From these ganglia start fibres and are distributed over the whole system. The chief involuntary structures, for example, the heart, the liver, the glands etc.,

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are under the influence of the sympathetic. This system is connected with the central one by means of the branches of communication which every ganglion sends to the adjacent spinal nerves. Some of these nerves return these branches to the adjacent ganglia. Thus a constant exchange of influences is maintained. The branches are shown in Fig. XVII by lines passing between the ganglia and the vertebræ. They are called rami communicantes and a single one is called a ramus communicans.

PLEXUSES

A *plexus* is a tangle of nerves and blood-vessels. Plexuses are formed in both the central and sympathetic nervous systems and are great centres of nervous influence.

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SARVĀÑGĀSANA

or

THE PAN-PHYSICAL POSE

THE NAME :—

The pose is called Pan-Physical because it influences the thyroid (vide Fig. XXVII), and through it the whole body and its functions.

THE TECHNIQUE :—

The student first lies supine on his seat with all his muscles completely relaxed and his mind thoroughly concentrated, as shown in Fig. XVIII. Then he slowly raises his legs through the hip-joint till they make a right angle with the ground, all the while maintaining stiff knees. Upto now he does not bring into action his arms and elbows which play only a passive part. But here he raises his whole body with his legs thrown up; and resting his weight on his arms, resumes the position shown in Fig. XXI. At this point the student must see that his chest presses against his chin. Further, in order to complete the chin-lock, he bends his forearms through the elbows; and with his hands presses his trunk against the chin, till it is well set in the jugular notch. (Figs. IV and XXVI). Fig. XIX represents the full pose. In this practice the posterior part of the neck lies close along the ground, the trunk and the legs are in a straight line and the mind is fixed on the thyroid. Only under exceptional circumstances such as noted in the second part of the article, attention is directed to the

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Fig. XVIII

Lying Supine for Sarvâṅgâsana.

पुस्तकालय
गुरुकुल काँगड़ी

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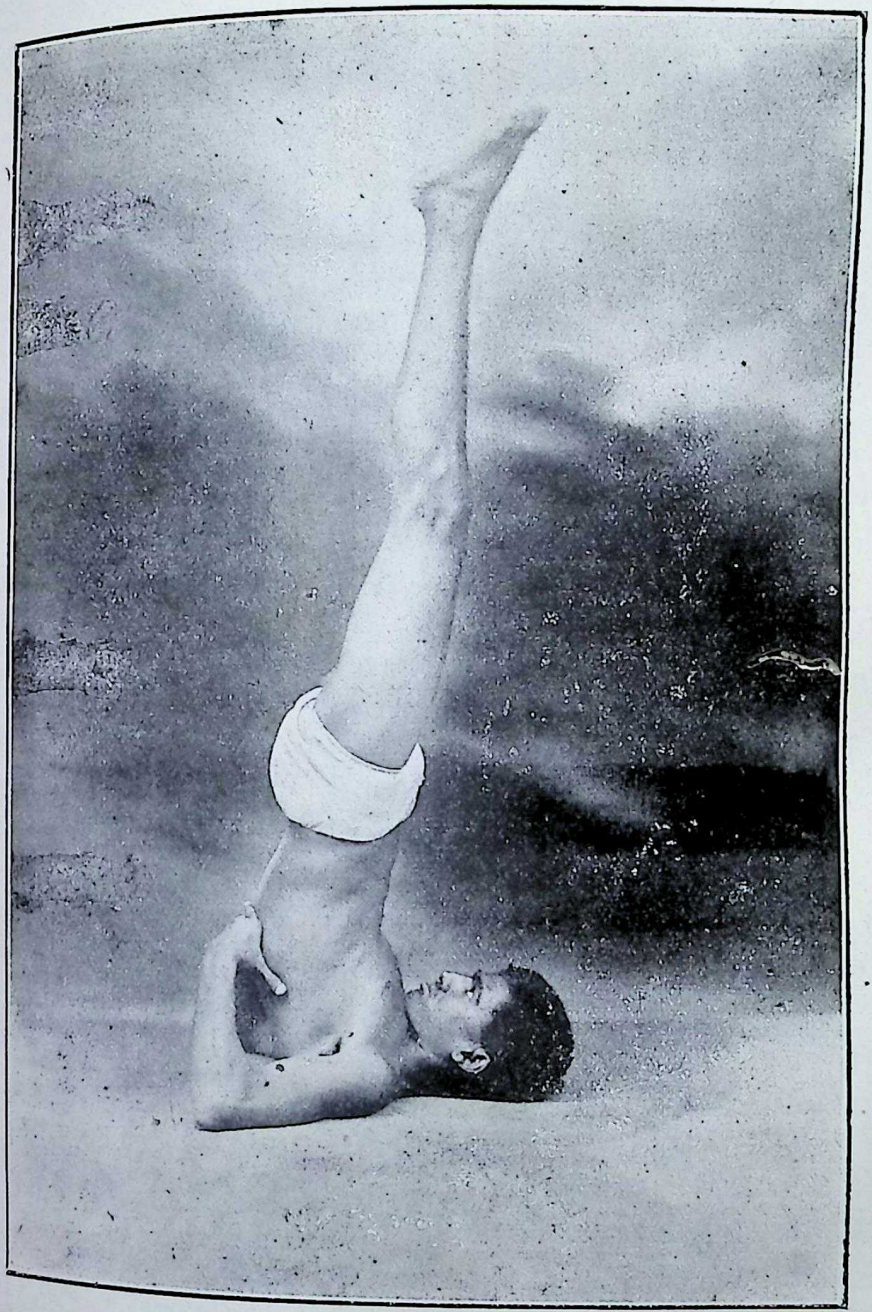
Fig. XIX



Sarvâñgâsana or The Pan-Physical Pose.
(Side view)

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Fig. XX

Sarvâñgâsana or The Pan-Physical Pose.
(Back view)

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toes as shown in Fig. XIX. Weaklings should make haste slowly. They may start even with half a minute's practice. Patience and perseverance will overcome every difficulty and in course of time the student will be able to build a healthy thyroid. To reap full advantages one must devote at least 20 minutes a day to this exercise. Fig. XX represents the back view of the pose.

POINTS OF STUDY :—

(a) *Blood-vessels* :—

The arch of the aorta, the common carotids, the innominate, the subclavians, the inferior and superior thyroids are all inverted and send a richer blood supply to the brain. (Fig. XXIX). It is checked at various points and diverted to the thyroid gland. The course of the thyroid veins, from the gland to the heart, is kept open. This gives a free play to blood circulation.

(b) *Vertebræ* :—

The cervical vertebræ receive a steady pull posteriorly. (Vide Fig. XVII).

(c) *Nerves* :—

The fifth and sixth cervicals and the middle and inferior ganglia of the sympathetic are toned up. (Vide Fig. XVII).

(d) *Miscellaneous* :—

The hyoid bone presses on the second cervical vertebra and almost closes the pharynx. (Vide Fig. XXVII).

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SARVĀÑGĀSANA

with

HANDS EXTENDED

THE NAME :—

This pose is only a variation of the one represented in Fig. XIX and bears the same name.

THE TECHNIQUE :—

Details have already been noted on p. 54. Persons practising Sarvāñgāsana for therapeutical advantages noted in the following article, should devote to this variation only one-fifth of the time given to the original pose. The same proportion may be allowed from the point of view of physical culture. Fig. XXII represents the back view of this variation.

POINTS OF STUDY :—

These will be noted on some future occasion where the Popular Section will contain discussions on the physiology of this variation with its application to therapeutics.

NOTE—

The practice of this variation is essential as a complement of the Pan-Physical Pose. Figs. XXI and XXII have been introduced here simply to enable the students of Yoga to start their exercises in Āsanas systematically.

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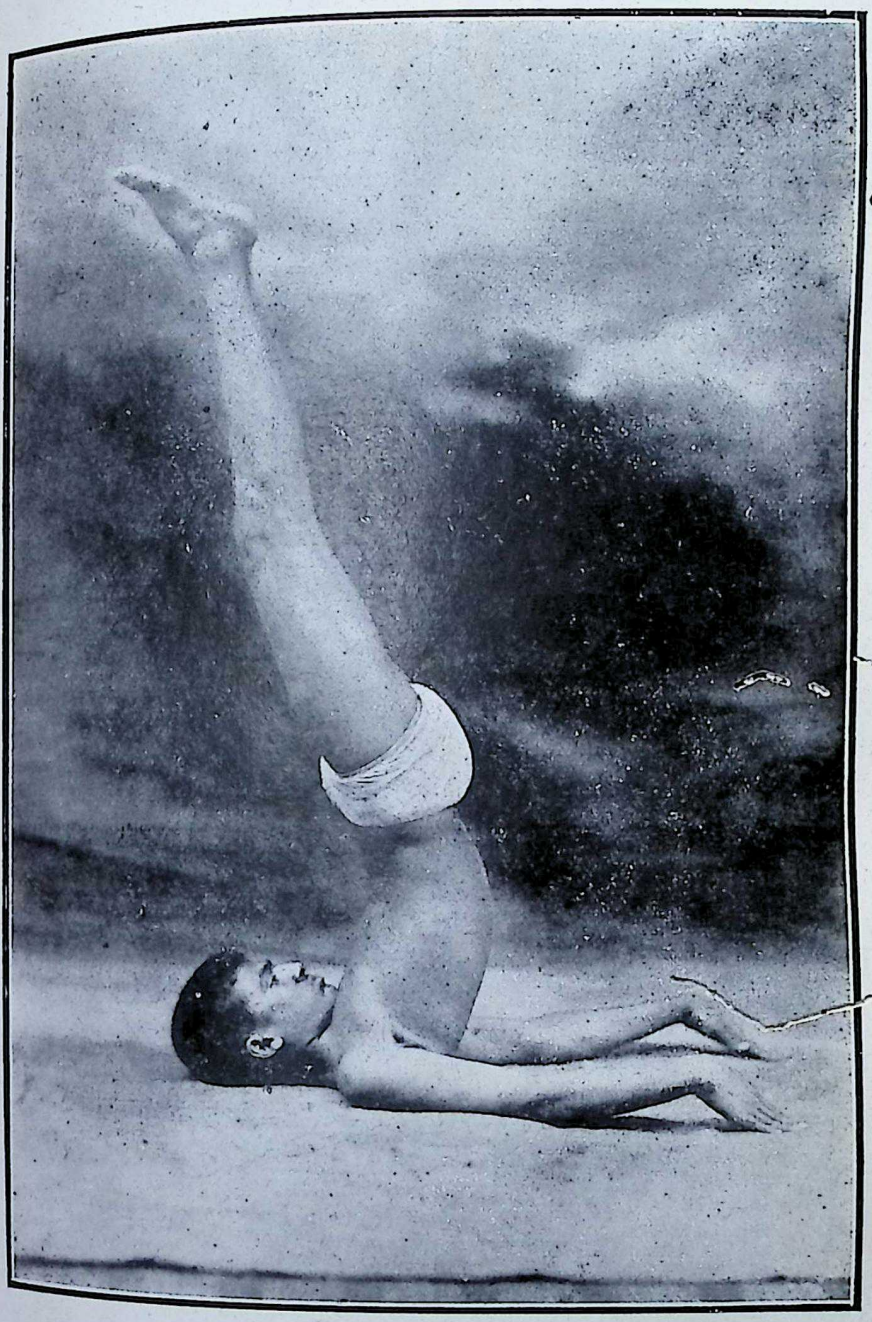
Fig. XXI



Sarvâñgâsana with Hands Extended.
(Side view)

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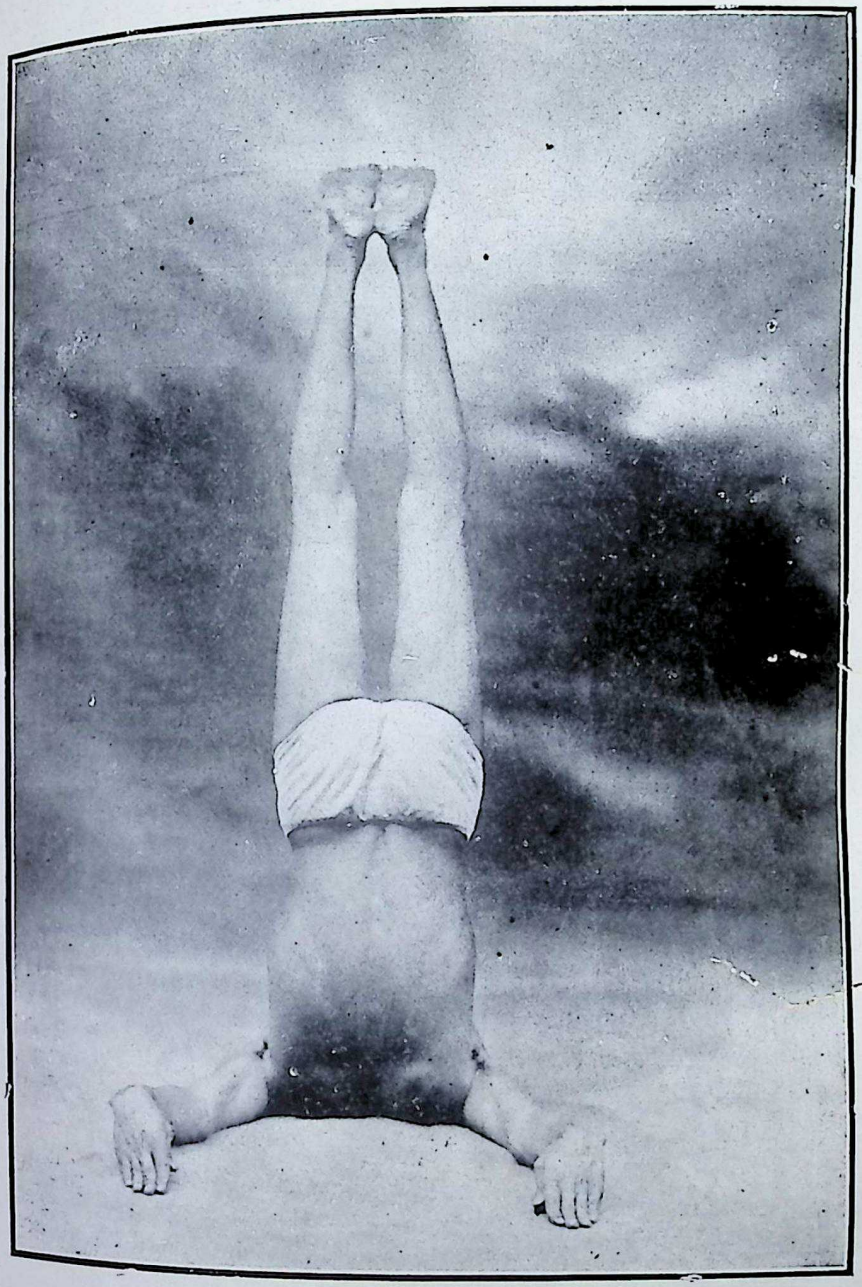
Fig. XXII



Sarvâñgâsana with Hands Extended.
(Back view)

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Fig. XXIII

Preparation for Matsyâsana.

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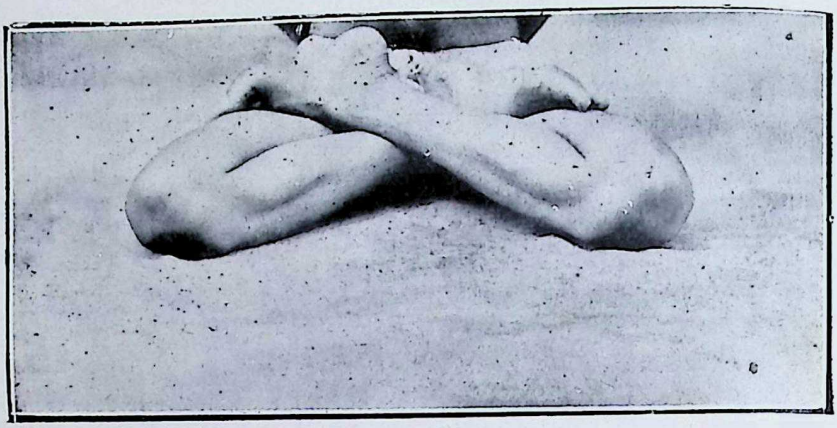
Fig. XXIV



Foot-Lock for Matsyâsana.
(Folded)

Fig. XXV

Foot-Lock for Matsyâsana.

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Fig. XXVI

Matsyâsana or The Fish Pose
(Side view)

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MATSYĀSANA

or

THE FISH POSE

THE NAME :—

This pose is called Matsyāsana because in swimming a person can float on water, like the fish, for a considerable time if he steadily lies there in this posture.

THE TECHNIQUE :—

The student first takes his seat with his legs fully stretched out as shown in Fig. XXIII. He then bends one of his legs, preferably the right, in the knee-joint; and folding it upon itself, sets the same in the opposite hip-joint, so as to allow the foot lie stretching at the root of the thigh with its sole upturned. The other leg is similarly folded and set in the opposite hip-joint. Both the heels he adjusts in such a way that each of them presses on the adjacent portion of the abdomen. This forms the foot-lock shown in Figs. XXIV and XXV. Fig. XXIV represents this foot-lock folded on the abdomen at right angles as is done in a sitting posture. Fig. XXV shows the same unfolded and held in a straight line with the abdomen. After this the student lies supine on his seat. Then resting his weight on the elbows, he raises his trunk and head; and throwing the latter backward with an arched spine, makes a bridge on his seat. (Fig. XXVI). Subsequently he make hooks of his forefingers and with these lays hold of the opposite toes which are now available on their wrong sides. Very often the hands instead of

Matsyasana or The Fish Pose (Side view)

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being given this position, are folded round the head. Fig. XXVII gives the front view of the pose.

This exercise when undertaken as a complement of the Pan-Physical Pose, should be given only three-tenth of the time devoted to the main pose.

POINTS OF STUDY :—

This pose is antagonistic to the Pan-Physical Pose at least as far as the cervical and upper dorsal regions are concerned. Additional details will appear in the pages of this journal when a separate article will be devoted to this posture.

NOTE—

The practice of this pose cannot be neglected if one wants to reap the full benefits of Sarvāṅgāsana. The anatomical parts named in Fig. XXVI are indicated here simply because they are markedly seen in this posture.

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SARVĀÑGĀSANA

or

THE PAN-PHYSICAL POSE

PART I

YOGIC culture divides itself into eight parts of which the third takes notice of the different poses. These are calculated directly to hold the physical forces in balance and indirectly to develop mental and spiritual powers.

This and the subsequent articles of this nature will, however, deal with the physical side only, as far as the present researches of the Aśrama would allow it.

A soft seat covered with a white cloth is generally used for the performance of these postures. As some of these are practised while lying prostrate on the ground, this seat is made to agree with the dimensions of a bed. The evening time is best suited for these exercises, as the muscles are most flexible at this hour of the day. Care must be taken to see that they are performed only with a light stomach. Needless to note that a well ventilated and a quiet room greatly improves the efficacy of these practices. It is to be particularly borne in mind that these are postures and not movements, and should be performed with a serene and concentrated mind

These poses constitute an excellent system of physical culture. The rationale of this part of Yoga would, however, be attempted after the most important of these postures are separately treated in this section of the journal; because a clear knowledge of the details of these is essential for intelligently following a statement of the general principles underlying them.

The Pan-Physical Pose which is the theme of the present article, holds a very conspicuous place in the field of Yogic

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physical culture; because it is one of the most powerful agencies that ensure and improve the health of the thyroid; and the health of the thyroid means, for the most part, the health of the whole body. What this thyroid is and how it is influenced by the practice of Sarvāṅgāsana will first be noted, so that a discussion bearing on the physiology of this pose and its application to therapeutics may be readily intelligible.

The thyroid is a ductless gland. The ductless glands are distinguished from other glands of the body by the fact that they have no ducts, the products of their activity being discharged into the blood either directly, or indirectly through the lymphatic vessels. Each of these ductless glands produces an internal secretion which contains one or more active substances and is distributed to other organs and tissues by the blood stream. The parathyroids, the adrenals and the spleen which will be referred to in the course of this article, are other examples of ductless glands[1]. Glands having ducts throw their formations into other parts of the body, as when the liver discharges its bile into the small intestine through the common bile-duct. These formations are not directly absorbed into the system as in the case of the ductless glands.

A reference to Figs. XXVII, XXVIII and XXIX will show that the thyroid is situated at the front and sides of the lower part of the neck opposite the fifth, sixth and seventh cervical vertebræ. The arteries supplying the thyroid gland are the superior and inferior thyroid arteries; sometimes there is an additional branch from the innominate artery or the arch of the aorta. (Vide Figs. XXVIII and XXIX). These arteries of the thyroid are remarkable for their large size and bring to it a rich supply of fresh blood. The veins that drain this ductless gland correspond in size to its arteries and make a free and constant play of blood possible. The nerves are derived from the fifth and sixth cervicals and through the middle and inferior cervical ganglia of the sympathetic. (Vide Fig. XVII).

1 Reference to the first two of these three glands will be made in the second part of this article.

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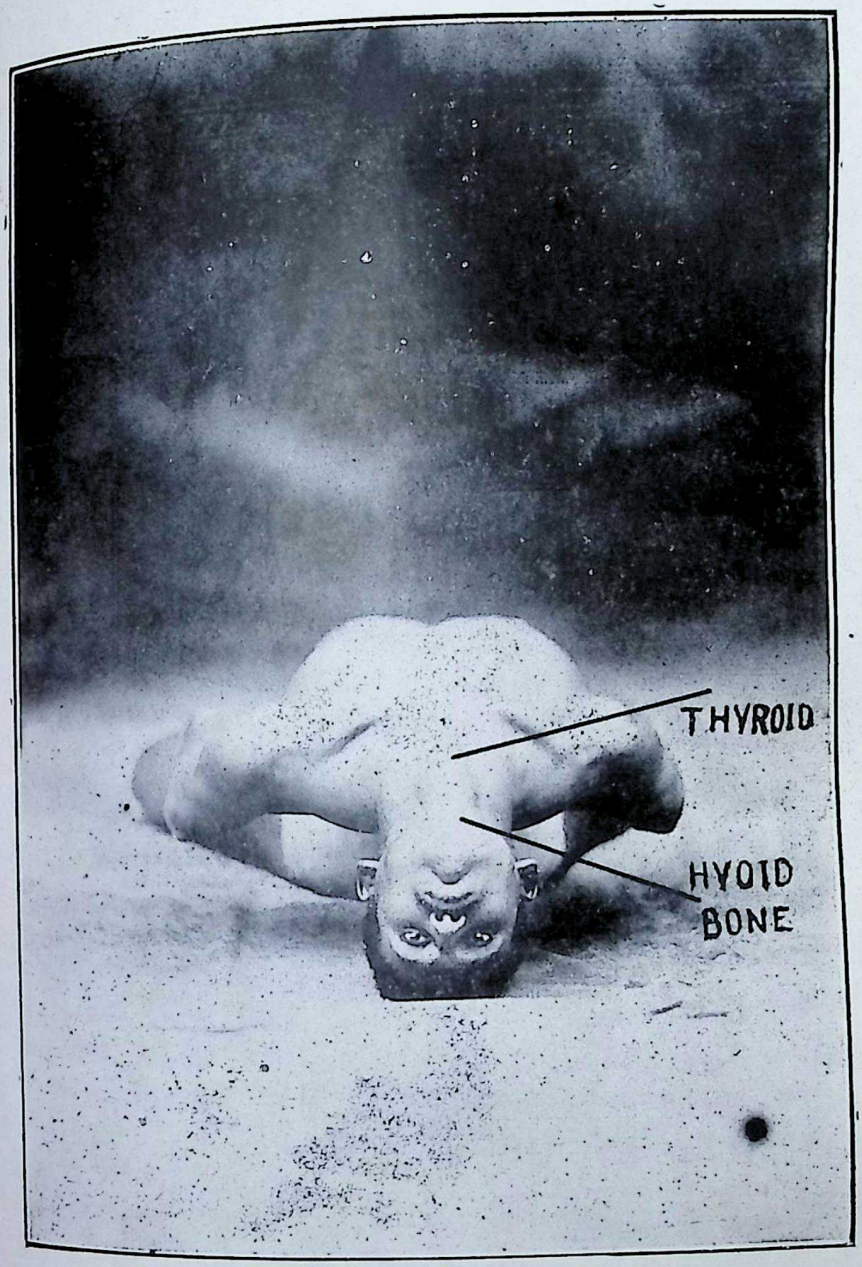
Fig. XXVII



Matsyâsana or The Fish Pose.
(Front view)

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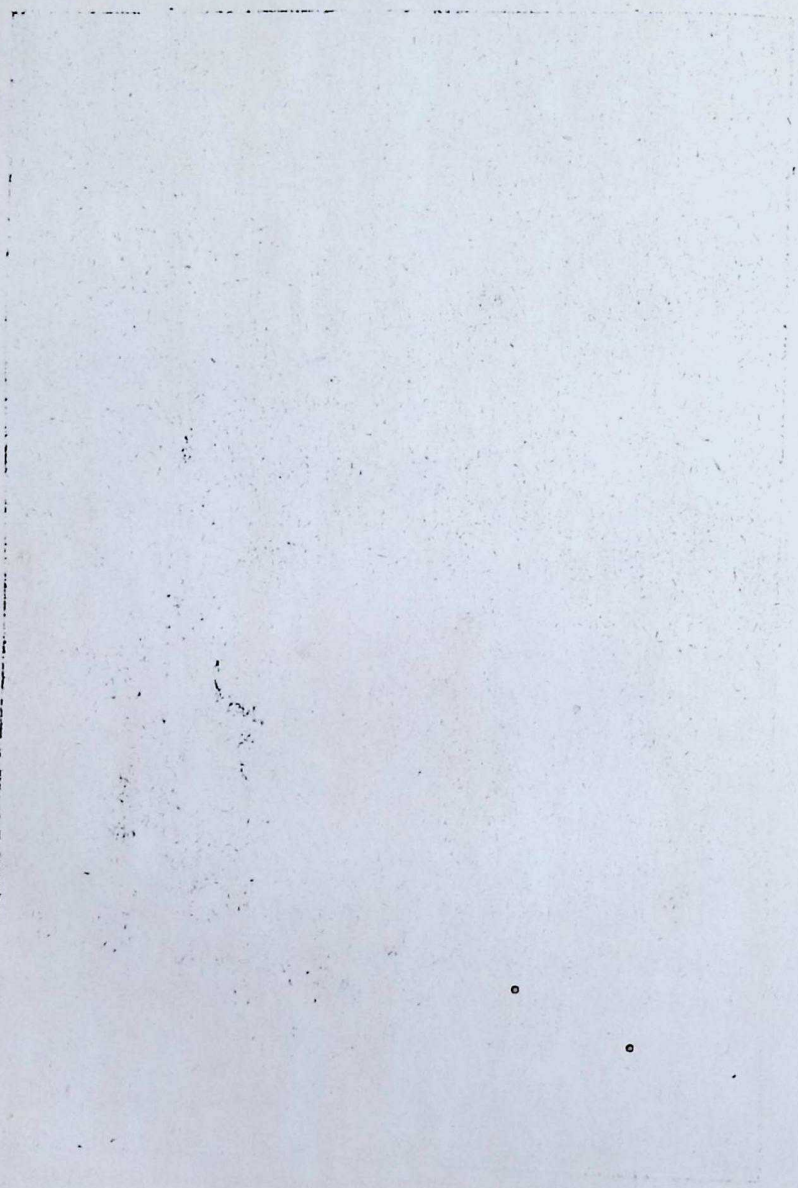

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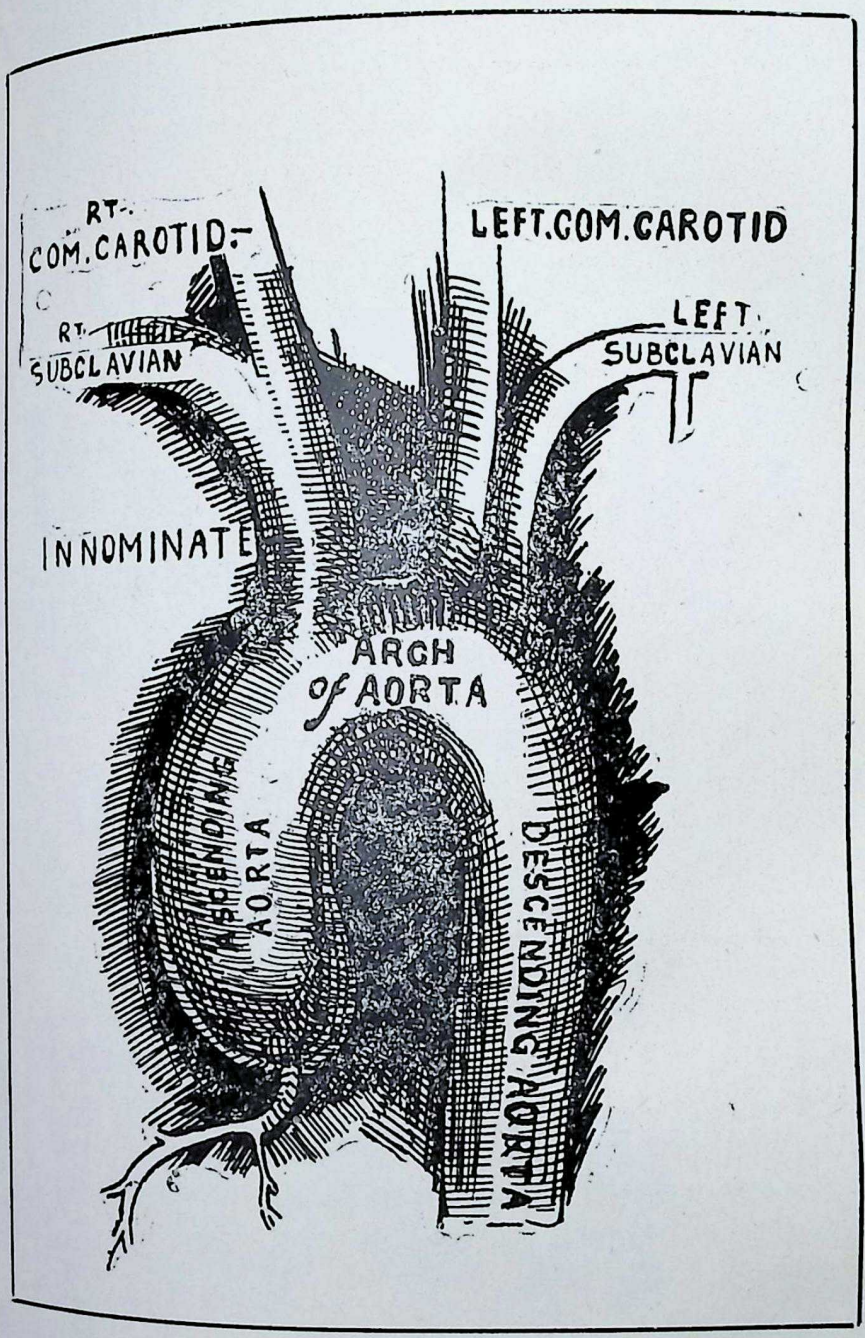
Fig. XXVIII



The Arch of the Aorta and its Branches.

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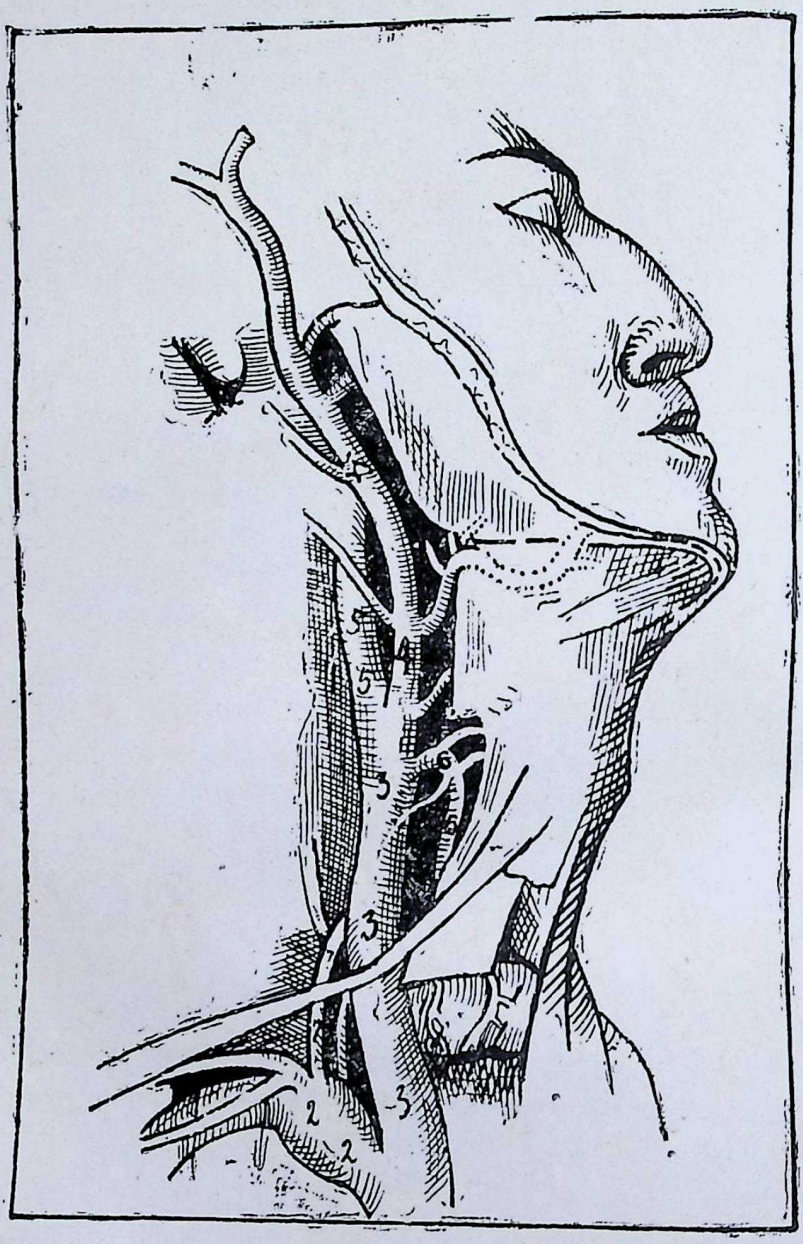
Fig. XXIX



The Thyroid Gland and the Arteries
affected by
Sarvâñgâsana.

1 The Thyroid Gland.
2 The Subclavian—First Part.
3 The Common Carotid.
4 The External Carotid.
5 The Internal Carotid.
6 The Superior Thyroid.
7 The Inferior Thyroid.

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It is to be noted that the fifth cervical nerves exit between the fourth and the fifth cervical vertebræ and that the sixth cervical nerves exit between the fifth and the sixth cervical vertebræ.

The health and activity of the thyroid chiefly depend upon the sound functioning of the arteries and nerves that supply it. Like all other organs of the body, the thyroid is constantly at work. If it is not fed with material that is necessary for the nourishment of its different parts, they will soon be exhausted and strike work endangering the health of the whole system. So nutrition must be perpetually brought to the tissues of this gland. Physiological work means chemical action. This chemical action produces in the thyroid waste substances which, if they are allowed to be in their original places, would develop toxins and poison the whole structure. These useless products must be perpetually removed. There is a third requirement of the gland for its being useful to the body. Its function is to manufacture particular internal secretions. Now this manufacturing requires certain substances and these must be made available to the gland. All these three needs are met by the circulation of blood carried on by the thyroid blood-vessels. The arteries bring in a fresh stock of blood rich with vitalizing substances and keep it playing about the different parts of the gland. As the current of blood flows past the tissues, they pick up the material necessary for their own nourishment and also absorb substances out of which they manufacture the fluids which they secrete. The stream of blood also sweeps off with it the waste products.

Infections, diseases, frequent pregnancies, sexual excesses, and many other agencies lead to the degeneration of this gland. Under these circumstances the ordinary blood current that flows to the structure, is not sufficient to restore it to its health. But if a richer blood flow is secured the gland improves and begins to perform its normal functions.

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Now the Pan-Physical Pose enables the thyroid arteries to bring this richer supply of blood to it, thereby preventing its degeneration and ensuring improved health. How the pose influences the arteries is discussed in the following lines with reference to Figs. XXVIII and XXIX.

The arterial blood circulation is mainly under the influence of nerves which govern the activity of blood-vessels. Whenever a larger supply of blood is needed for the functions of a particular part of the body, these vessels dilate and allow a stronger current to flow to that side. But when a smaller quantity of blood is required these vessels contract. The influence of nerves, however, is not the only force that governs the blood circulation in the body; the universal law of gravitation also plays an important part therein. If one keeps his hand raised straight above his head for a considerable time, he will discover that the fingers have suffered in blood circulation as the current had to rise against gravity. But if he lowers the same hand again and allows it to hang by his side, blood begins to course throughout the limb very forcibly, because it is attracted by the force of gravity. This very influence of gravity is taken advantage of in Sarvāṅgāsana for inducing a richer flow of blood through the inferior and superior thyroid arteries.

If these arteries are traced back, the superior thyroid arteries will be found to branch off from the external carotids which themselves spring from the common carotids. (Vide Figs. XXVIII and XXIX). These arteries are derived from the arch of the aorta, the left getting its blood supply directly from it, whereas the right getting it through the innominate artery. The inferior thyroid arteries also get their blood supply through the first part of the subclavians which like the common carotids are derived directly on the left and indirectly on the right from the arch of the aorta. Now this aorta is the sole carrier of the pure blood from the heart to all parts

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of the body. Just after it rises from the heart, it sends its blood through the common carotids and the subclavians to vitalize those portions of the body that are situated above the heart. Thus these four vessels get the best of blood from the heart; and if a substantial part of it can be driven through the thyroid, the gland can be maintained at its highest efficiency. This exactly is done through the Pan-Physical Pose.

A reference to Figs. XIX and XX will show that in this pose the whole body is made to stand almost at a right angle with the neck, the posterior part of which is quite level with the ground, the chin being closely set against the V-shaped jugular notch. (Figs. IV and XXVI). The sixth and seventh cervical vertebræ stand vertical whereas the remaining five are lying stretched horizontally. The hyoid bone (Fig. XXVII), presses tightly upon the second cervical (Fig. XVII), and very nearly closes the pharynx. This is indicated by the difficulty experienced in respiration and the deglutition of the salivary contents of the mouth during the pose. The sharp angle of the neck and the consequent pressure of the hyoid bone exert a considerable check on the blood circulation of the two carotids (Fig. XXIX), at a point which is situated just above the root of the superior thyroid arteries. Thus the blood stream running through the common carotids gathers volume and is largely driven through the superior thyroids considerably increasing their normal supply. The hands supporting the trunk as shown in Fig. XIX contract their biceps. These contracted muscles check the blood flow of the brachial arteries which run past them in the arms. Here too the current swells backward and is gathered in the first part of the subclavians. This larger volume is sent through the inferior thyroids in addition to their normal supply. Thus the different checks put upon the arteries enrich the blood flow of the thyroid arteries. But the advantages of this pose regarding the blood circulation of the thyroid gland do not end here. The law of gravitation plays a prominent part in helping the thyroid in getting its nourishment. Normally blood has to rise against gravity when it flows from the heart to the thyroid.

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But the upside-down position of the trunk in Sarvāṅgāsana inverts the arch of the aorta, common carotids and subclavians.

Then the law of gravitation operates and attracts far more blood through them than is ordinarily available; and as seen above, sends it to the thyroid gland.

This abnormally large supply of blood that is brought to the gland by the Pan-Physical Pose is easily drained by its veins. As has been noted above, the veins of the thyroid match with its arteries in their size. Both of them are conspicuously large. Again the path of the veins from the gland to the heart is kept free by the pose which allows a free flow of the returning blood.

In this way the Pan-Physical Pose keeps a liberal supply of blood playing from the heart to the thyroid and from the thyroid to the heart, giving the gland opportunities to get its nutrition, to manufacture its secretion and to wash off its waste products.

But the pose helps the thyroid not only through the circulatory system but also through the nerves. It may be truly said that the nerves are responsible for every physical function. No organ whether small or large, can carry on its work without getting its energy through the nervous impulses. So long as the nerves supplying a particular organ are healthy and normal, it gives its usual work; but as soon as the nervous force becomes abnormal, the organ gets out of order. Nervous disturbance may cause acute pain in the parts supplied by the affected nerves. The whole nervous system, however, including ganglia which are only groups of nerve-cells, continues to functionate well so long as it gets its normal blood supply. But the spinal nerves stand in the danger of suffering in their function even if some vertebra is slightly misplaced. So for the sound functioning of the thyroid, not only an efficient arterial service is sufficient, but its nerve supply must also be kept healthy. Even this is done for the gland by the Pan-Physical Pose.

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It has already been observed that the nerve supply of this gland comes from the fifth and sixth cervicals and also from the middle and inferior cervical ganglia. In order that the fifth and sixth cervicals may not suffer from the subluxation of the bones of the spinal column, the fourth, fifth and sixth vertebræ must be kept in their respective places. This can be done if the ligaments that bind them are strong and healthy. This pose by inducing a large blood supply to the whole cervical region bathes the fibrous tissues of ligaments in copious fresh blood and gives them a superior tone. Slight subluxations in the vertebræ are corrected by the steady pull exerted on the cervical part of the spine through this posture. In this way the danger of the thyroid nerve supply being affected is effectively avoided. The free play of fresh blood which this pose brings about, also invigorates the middle and inferior cervical ganglia. So by helping the thyroid through the circulatory as well as the nervous system, the Pan-Physical Pose is calculated to bestow upon it the best of health.

Matsyāsana or the Fish Pose (Fig. XXVI) is complementary to the Pan-Physical Pose. The cervical vertebræ and ligaments must undergo a steady pull both anteriorly as well as posteriorly in order that they may be strong, healthy and set in their proper places. The two postures, bending all the cervical parts backward and forward, between them accomplish this purpose. Matsyāsana completely opens the pharynx and affords one of the most comfortable postures, for rapid and incessant deep breathing technically called Bhasrā in Yoga. So, whenever, Sarvāñgāsana is practised, Matsyāsana should also follow. It would largely help Sarvāñgāsana in producing the desired results.

Upto now it has been theoretically shown that the Pan-Physical Pose is calculated to build a healthy thyroid. It is now to be seen whether or not there is any clinical evidence to prove that Sarvāñgāsana profoundly influences this ductless gland.

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Before examining the clinical evidence available, it is necessary to consider briefly the physiology of the thyroid; so that if it could be conclusively proved that Sarvāṅgāsana influences this physiology, it would logically follow that this Āsana must be influencing the thyroid gland.

There is not even one-thousandth inch of our body surface which does not swarm with innumerable bacteria. These are ever ready to get into the body; and as soon as the smallest opportunity is offered to them, as by a slight wound, they at once invade the tissues and create diseases. The dust in the streets of the thickly populated cities bears millions of microbes; and as the people hurry about their business, these terrible foes find their way to their blood and seriously poison it. The food and drink is also more or less teeming with these microscopical foes of life and are voluntarily admitted to our body to work its ruin. Besides these outsiders, the body itself is busy giving birth to these destructive lives. The food and drink may putrefy while yet it lies in the body undischarged and may propagate these formidable enemies. The food is to be assimilated and converted into energy. The process by which this is done is called *metabolism*. This metabolism produces many waste products which may be turned into terrible toxins in the body. Thus life is in the midst of destructive agencies actively operating on all sides.

But Nature has very carefully provided the body with defences which counteract these fatal forces. Some of these poisons are destroyed and others are eliminated. The thyroid gland is a very important toxin-destroying organ as it greatly influences the production of anti-toxins in the body. So long as this gland is strong and healthy, it will, as far as possible, defend the body against bacillary attacks by destroying the bacilli with its secretions; but its degeneration impairs its secretions with the resisting power of the body and diseases easily establish themselves. Therefore, in diseases that are due to the

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degeneration of the thyroid, extracts of this gland are administered to the patients. These extracts serve the purpose of the natural secretions and destroy the invading bacilli. This method of treating diseases is called *organotherapy* and the administration of the thyroid extracts is called the *thyroid treatment.*

Now if Sarvāñgāsana is capable of restoring to health a degenerated thyroid, it must prove to be a substitute of this modern thyroid treatment. For a healthy thyroid must be able to produce those elements which are artificially introduced into the body in organotherapy. And if the Sarvāñgāsana treatment could take the place of the thyroid treatment, it undoubtedly follows that there is conclusive clinical evidence to show that Sarvāñgāsana profoundly influences the thyroid.

Organotherapy prescribes thyroid treatment against leprosy. Dr. Sajous, a leading authority on this system of therapeutics, says that the aim of the treatment should be to destroy the bacteria by increasing the bacteriolytic (killing the bacteria) power of the blood. For this he recommends the use of the thyroid gland in a particular proportion. Even according to this savant, the thyroid treatment has not yet given satisfactory results in leprosy. But he thinks it to be most useful in improving the patient.

Now in India Yogic tradition claims to cure lepers by the Sarvāñgāsana treatment which requires a milk diet. A great Yogin of the Deccan used to prescribe this practice to his leper patients. The Yogin has left the mortal coil long since; and we could get no opportunity of observing the progress of such patients, after we began to take active interest in Yoga. But luckily or unluckily for us, we had to be in close touch with a leper who was following the Sarvāñgāsana treatment at the instance of the Yogin referred to above.

The patient was wayward. In spite of the dangerous disease threatening him with prolonged suffering and miserable death, he would devote only a few months to a particular treatment

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and that too not very seriously. Fortunately he continued the Yogin's treatment for about a year, and though the disease had well established itself, to the great surprise of himself and his friends, the leper showed great improvement. His fingers and toes he could move with ease, though he had lost his control of these parts, their muscles being atrophied. He had gaping ulcers between his toes and fingers that discharged loathsome fluids; but these ulcers healed in a year's time. The general metabolism improved and as a consequence of better health, the patient's outlook on life became brighter.

But this would not last long. Some of the worst morbid tendencies of the leper asserted themselves in spite of the holy atmosphere in which he lived on the banks of the Narbuda. There was a fearful relapse when the patient preferred to be in a leper asylum where he died of this disease some three years later.

Notwithstanding the tragic end of the case, the results of the Sarvāṅgāsana treatment were clearly favourable to Yogic Therapeutics and substantiate the proposition that the Pan-Physical Pose helps the thyroid to improved health enabling it to destroy bacilli by its increased secretions.

A few words about the milk diet prescribed by Yoga may not be out of place here. According to the researches of Breisacher, Blum, Kishi and others, it has been established that milk contains some of the principles present in the thyroid secretion. Animals whose thyroid was extirpated lived long, if fed on milk; but succumbed otherwise, indicating that milk could be a substitute for the thyroid secretion at least in some respects. This will show how helpful milk diet must be to a leper. Not only in the pathological conditions but in healthy practices also, the Yogins never failed to prescribe a milk diet whenever there was a chance of the thyroid being adversely affected. A condition of low

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No. 13

vitality follows as a consequence of some Yogic practices for awakening certain spiritual forces that are ordinarily dormant. Yogins make a milk diet obligatory whenever these practices are undertaken, showing thereby the high degree of intelligence that they brought to bear upon the physiological problems of their science and art.

The preceding discussion will show that the Sarvāñgāsana treatment is capable of largely controlling leprosy, although it may not completely eradicate it. Reports have reached us of lepers being cured of their disease by Yogic Therapy; but we have yet to know a cure where microscopic examination did not discover the bacillus lepræ. There is no doubt, however, that the Yogic treatment can wonderfully help the sufferer and relieve him of his misery to a considerable extent. In India Yoga is looked upon as a religious activity and hence the Indian patients' psychology is likely to be very favourably influenced by this treatment. So claiming this additional advantage, Yogic Therapeutics has many chances of success in the cure or control of Indian lepers. We are simply appalled when we think of the havoc the bacillus lepræ is working among our countrymen. Nearly a hundred thousand souls have been damned to unending agonies by this insidious bacillus. We, as the Director of the Kaivalyadhāma, would be only too glad to develop a leper asylum if a princely donation is coming forth for the purpose.

The effect of the Sarvāñgāsana treatment on lepers is not the only evidence that can be adduced as a proof of the truth that this Āsana can build a healthy thyroid. There is ample additional testimony which is of a more convincing character.

Modern researches in the field of the physiology of ductless glands, have proved that they are very closely related to one another. The thyroid exerts a very great influence on the sexual glands which in their turn affect the thyroid. The

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testes are ductless glands and are in intimate relationship with the thyroid. If it can be clinically shown that the Pan-Physical Pose can restore to health the atrophied testes, it would demonstrate that this pose does help the thyroid to health.

The following is a typical case in point. A young man in his thirties developed a mode of life which was calculated to lead to the degeneration of his testes. The expected results followed and these glands became visibly atrophied. At a rough calculation the two glands must have lost between them four grammes of weight. The youth changed his mode of life as far as his sexual glands were concerned; but during the next six months no symptoms of improvement made themselves visible. Afterwards he took to the practice of Sarvāṅgāsana and in the next three months found that his glands were improving. Another three months of close application to the pose and the testes reverted to their original size and weight. There are other cases also yielding the same proof; but they are not so telling.

This influence of the Pan-Physical Pose on the testes leaves no doubt about its capacity to help the thyroid; because that is the only ductless gland which the pose approaches directly through the circulatory and the nervous systems and which very largely affects the other glands of the type.

A number of young men suffer from testicular degeneration for various crimes committed against themselves and the society. The Sarvāṅgāsana treatment is one of the best remedies they can adopt to repair their losses. In delicate cases requiring a cautious handling, the treatment should not start save under competent supervision; for Yogic Therapy like every other system of therapeutics, demands a detailed knowledge of its working.

What the testes are to men, the ovaries are to women. The Sarvāṅgāsana treatment is likely to help the female

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world to get rid of the manifold maladies due to the degeneration of their sexual glands. We use the word *likely* because we have no clinical evidence to show in support of our statement. But when it is theoretically as well as practically proved that the testes improve under the Sarvāñgāsana treatment, there is hardly left any doubt regarding the capacity of this treatment to help the ovaries to better health. We will briefly indicate here a typical disorder which is due to the ovarian degeneration and can be set right by the practice of this pose.

According to Dr. Lorand and others, particular ladies suffer from obesity. This is caused by the degeneration of their ovaries due to some infectious disease, frequent pregnancies, sexual excesses, or the absorption of certain toxic products. This obesity is called *endogenous*, that is, having its origin within our own economy, and depending on changes in the ductless glands. This has little to do with the other type which is termed *exogenous*, because it arises out of agencies coming from without such as the food we introduce into our body. Females addicted to rich food, with little exercise, are often red in the face and they are plethoric. These can reduce their fat if they take to simple diet and some physical exercise. They are rarely constipated and perspire freely. But women suffering from endogenous obesity are very much constipated, have little appetite and very seldom perspire. Their looks are pale and their skin is dry and cold. In India an experienced dame can easily detect the endogenous obesity in her sisterfolks. This condition is often accompanied by sterility because it is due to the degeneration of the ovaries. Very frequently ladies suffering from this malady are made to observe fasts for reducing their fat; but the measure gives little relief to the sufferer and she continues to be sterile.

Under these circumstances, the Sarvāñgāsana treatment is sure to be of great help. The improved thyroid would promote

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metabolism and lead to the disappearance of fat. It would also restore the ovaries to health which would make conception possible.[1]

Women are more religious than men, at least in India. Therefore, Yogic practices are likely to help ladies much better than men; for in the case of the former psychology would come to the help of physiology. There are clear references in the ancient literature of India proving that the weaker sex was strongly attached to Yogic life. To-day the Indian ladies have almost completely lost their touch with this phase of religious activity. Will the most advanced of the lot come boldly forward to regain the ground which they have lost; and through the Yogic culture try to evolve a womanhood in India that would be the envy of other nations on account of its physical, mental and spiritual excellence? But this is only by the bye.

The effect of the Pan-Physical Pose on the thyroid can further be demonstrated by the clinical facts gathered from the Sarvāṅgāsana treatment of the spleen, the appendix and the liver.

The spleen is the biggest ductless gland in the human body and plays a very prominent part in defending it against the bacilli that are either introduced from without or developed in the system itself. The leucocytes, that is, the white blood corpuscles, are largely formed in the spleen and spread to the different parts of the body through the circulatory system. During their career if they cross any bacilli, they are immediately rendered harmless by these leucocytes by eating them up. Thus the spleen carries on its anti-toxic activity throughout the system. But there is another way by which this gland protects human life. It arrests the invasion

1 There are various causes of female sterility. We are theoretically convinced that some of these can be effectively removed by particular Yogic practices. We strongly suspect that some of the Yogic exercises may be highly useful in solving the problem of birth control, in a way that would be free from the objections taken against the Western methods. We are anxious to collect clinical evidence in the matter and earnestly request our countrymen to help us in our efforts.

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of microbes and keeps them from entering the circulation. In infectious diseases, such as the typhoid fever and malaria, the spleen is swollen ; because it confines the bacillary infection to itself and prevents it from spreading to other parts, in order to save the whole organism from its serious consequences.

The spleen is highly under the influence of the thyroid. Clinical evidence shows that the Pan-Physical Pose can set right a disordered spleen. The natural conclusion is that Sarvāñgāsana must be directly influencing the thyroid and only indirectly the spleen, for the Āsana has very little to do with the spleen directly.

Only a typical case is quoted here. A boy of sixteen had a degenerated spleen. His power of resistance to bacillary infection being consequently weakened, he repeatedly suffered from the attacks of malaria, every time the boy being left in a worse state of health. Prolonged medical treatment against malaria had little effect on his system. Afterwards he took to the practice of Sarvāñgāsana and in something like six months became permanently free from his spleen trouble. It now began to function well and could save the boy against malarial infection.

The degenerated spleen and thyroid of the boy, during the period of his illness had affected his appendix. This organ too showed distinct improvement after the Sarvāñgāsana treatment, indicating thereby the influence of the pose on the thyroid gland. For according to physiology, if the pose could work upon the appendix, it could do so only through the thyroid.

Now only the effect of this pose on the liver will be cited as an evidence of its influence upon the thyroid and this part of the article will be closed.

The liver is not a ductless gland ; but it has also its internal secretions. The researches of modern scientists have proved that this gland too is, to a large extent governed by the thyroid. Sarvāñgāsana is found to help the liver to health.

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A man suffered from liver complaints ever since his boyhood. For years he was medically treated. He did get temporary relief from these treatments; but the trouble would soon recur. His digestion suffered and his bowels were constipated. He got rid of his digestive troubles with the help of different gymnastic exercises and yet his liver would not be long in order. At last he zealously took to the practice of Sarvāṅgāsana and now in a period of something like two years has never found his liver gone bad.

The clinical evidence produced here when taken collectively irresistibly leads to one conclusion only. It clearly proves that the Pan-Physical Pose very effectively helps the thyroid to regain its health and strength. When it is seen that the same pose can influence structures so widely situated in the human body, one cannot but conclude that it must be acting on a centre that is responsible for the functions of these different organs. Such a centre is supplied by the thyroid.

Independent of these clinical considerations, the anatomical and physiological studies of the pose point to the same gland as the object of its work.

So both theoretically as well as practically it is established that Sarvāṅgāsana can build a strong and healthy thyroid.

Curative physical exercises, as a general rule, are available as preventive practices. For instance the exercises which remove liver complaints are also useful in keeping the organ perfectly healthy. It is in the interest of every human being to maintain his physique in a high state of efficiency. The thyroid is a centre which if kept in the best of health, would generally ensure full efficiency in every part of the body. Sarvāṅgāsana has been proved to be a very effective exercise for the thyroid. Is it not desirable that everyone should devote some of his time to the practice of this pose and thus secure for himself high physical efficiency?

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For

Intellectual Moral

and

Spiritual Training

The Kaivalyadhāma

Affords Unique Facilities.

Youths!

Do Avail of Them.

Kuvalayananda,

Director, Kaivalyadhāma.

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Following diseases, especially in their chronic condition, can be effectively treated by the Yogic methods :

1 *Constipation.*
2 *Dyspepsia.*
3 *Headache.*
4 *Piles.*
5 *Heart-disease (functional).*
6 *Neuralgia.*
7 *Diabetes.*
8 *Hysteria.*
9 *Consumption.*
10 *Obesity.*
11 *Sterility (certain types).*
12 *Impotence.*
13 *Appendicitis, &c.*

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Yoga-Mīmānsā

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IN
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A FEW APPRECIATIONS

"During the last few years a gallant attempt has been made, under the supervision of Swami Kuvalayananda to carry out a systematic and practical study of Hatha-Yoga, by applying to it Western methods of observation, with a view to demonstrating its *raison d'être* and its high therapeutic value. The results of these studies by Indian practitioners have been appearing in his very valuable periodical called *Yoga-Mimansa*."

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The Modern Review, Calcutta.

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The Journal of Ayurveda, Calcutta.

"From its general appearance and get-up of the journal and the matter it contains one can see that the work is in able hands and in time the institution will be as useful and popular as the New York Institute of Science."

United India & Indian States, Delhi.

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सोऽहम् ।

Yoga-Mīmānsā

EDITED BY

S'RĪMAT KUVALAYĀNANDA

(J. G. GUṆE)

February 1925
Third Impression

Vol. I No. 2

KAIVALYADHĀMA

Post—LONAVLA

(BOMBAY-INDIA)

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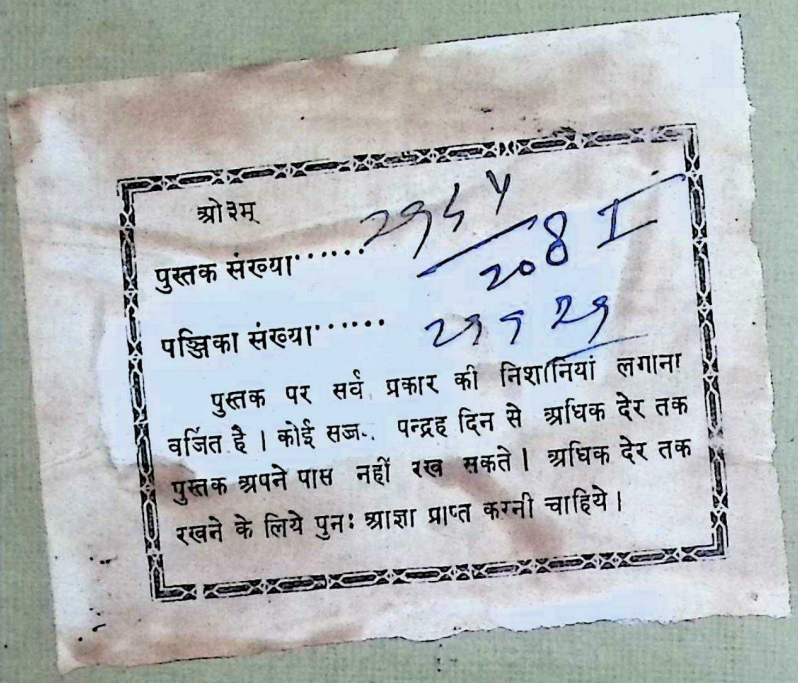

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पुस्तक संख्या..... 2944/208 I

पञ्जिका संख्या..... 2929

पुस्तक पर सर्व प्रकार की निशानियां लगाना वर्जित है। कोई सज्ज.. पन्द्रह दिन से अधिक देर तक पुस्तक अपने पास नहीं रख सकते। अधिक देर तक रखने के लिये पुनः आज्ञा प्राप्त करनी चाहिये।

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तदेकोऽवशिष्टः शिवः केवलोऽहम् ।
I alone persist : Blissful : Absolute.

ॐ

सोऽहम् ।

Yoga-Mimansa

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(J. G. GUNE)

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सर्वं खल्विदं ब्रह्म ।
All this is, indeed, Brahman.

नेह नानास्ति किञ्चन ।
There is nothing Here apart from it.

शरीरमाद्यं खलु धर्मसाधनम् ।
Surely Health is the primary requisite of spiritual life.

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तदेकोऽवशिष्टः शिवः केवलोऽहम् ।

सोऽहम् ।

YOGA-MĪMĀṄSĀ

VOL. I FEBRUARY, 1925 NO. 2

Editorial Notes

May the Maker of all make this journal a success. Blessed is the name of the Lord. May He bless the workers of the Ās'rama with a happy and prosperous career as servants of the world which is only the Lord Himself objectified. May He, that has created us in His infinite wisdom, lead us to the light that is beyond all darkness.

It has been nearly four months since we presented to the public the first issue of our journal. During all these days, the Ās'rama has been making a steady progress, and its work is being more and more appreciated by the general public. We have received a number of letters from distinguished persons, not only of India but also of other countries, stating their intellectual appreciation of what is being done by the Ās'rama and sending us a message of encouragement. The services of the Kaivalyadhāma have been more and more in demand ever since its foundation last October. The circle of people seeking Yogic instruction is appreciably widening, the number of patients placing themselves under Yogic treatment is gradually increasing, and the list of subscribers patronizing this journal is steadily growing. Thus there is progress nearly in every direction. Whatever credit this little success deserves goes, all of it, to the Lord and to our merciful Master. None of it comes to us

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and none of it we claim. We know our powers; we know our limitations ! And in our consciousness of these, nothing is left to us but to kneel in gratitude before our Maker and our Master; and in reverence offer our humble salutations to them, for having selected us to be the agents of this achievement. May they, as a token of their mercifulness to us, the humblest of their servants, allow us to continue their work and bless it with greater success.

During the last quarter we spent some six weeks in a lecturing tour. Ahmednager, Sholapur, Dhulia, Akola and Buldana were the district towns we visited. Lectures were also delivered at some Taluk places. Our experience of this tour is highly encouraging. People of all grades and ages largely attended our discourses. Practical demonstrations of Yogic exercises were given after a theoretical discussion, and they invariably created a deep impression upon the mind of the audience. There was a regular rush of people demanding lessons in Yogic culture everywhere, though our short stay at these places made solid work impossible.

We beg to offer our hearty thanks to those editors of papers and periodicals that have spared their valuable time in reviewing our journal. Some of these reviews have been quoted in the Miscellaneous Section. It is a matter of great satisfaction to us to see these learned men speaking of our humble work in such an eloquent manner. In fact the praise that these reviewers have bestowed on us, is all beyond our expectations. We only wish that the Lord would enable us to deserve all this kindness at their hands.

While the majority of our reviewers have rightly understood the character of our researches and the journal that records them, there appear to be some who have missed the point. They are sorry to see that the first number *does not contain even one article on Yoga proper, that is, mental and spiritual culture.* Now we humbly beg to bring to the notice

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of these learned men that the journal is dedicated to record only the *scientific* researches in the field of Yoga. Scientific research can advance only step by step. It cannot at once cover the whole Yogic field. It has started with preliminary practices and will *gradually* proceed from grosser to subtler things. So it will take some time before the higher Yogic exercises are discussed in the pages of this journal.

THE quotation given in Italics in the last note, seems to suggest, however, that the practices discussed in the first issue do not fall under *Yoga proper*. We do not know whether this suggestion has any authoritative research scholarship behind it. So far as our experience and researches go, we are more than convinced that the exercises mentioned in the last issue have a spiritual bearing. We have expounded only the physiological side of these, simply because *laboratory methods* upto now could tackle only that much ; and our journal has no place for free speculation. We hope to publish even the psycho-physiological aspects of these practices, as our research work advances ; but even then we cannot record anything in this journal that has not passed the rigorous test of modern sciences.

The quotation appears to suggest another thing. Yoga proper is (*only*) mental and spiritual. Now this is a proposition we absolutely fail to understand. We have to confess, in all frankness, that we have yet to know a Yogic exercise that is purely mental and spiritual and has no physiological bearing. We have stated in our notes last time that Yoga is *chiefly* mental and spiritual; and we still maintain the same position. Researches in the mental and spiritual aspects of Yoga, are undoubtedly far superior to the researches in its physiological aspect; but this does not prevent the latter from falling under Yoga proper.

WE would make our position clear once more. Persons that are equipped with an undying *faith* in spiritual culture and its attainment through Yogic practices, require no scientific

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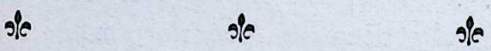
interpretations of these for their progress. But those that take their stand upon *reason*, would be satisfied with nothing short of a scientific explanation of Yoga, if they are to be induced to take to it. There are a number of people falling under the first category, that have placed themselves under the guidance of the Āśrama for their spiritual development. They are not required to wait for a scientific interpretation of an exercise. As soon as they are ready for a particular practice, they start with it. But here too, our experience shows that these people feel stronger in their faith, when they are given a scientific explanation of their work and experiences.

Luckily or unluckily, however, this class of people is fast disappearing. An overwhelming majority of us want our reason to be satisfied before we can accept anything. It is to satisfy the need of such people that the journal is started.



That the journal is supplying a real want is made clear by the patronage it is getting from all parts of India. The subscribers' list is swelling every day. Letters of thanks are being showered upon us. In our tour many people who entertained tender feelings for Yoga, and who were deeply pained to see that it was losing ground, inch by inch, before the onslaught of modern sciences, have expressed the sense of relief they felt, when they listened to our discourses.

A reference to the letter of Mr. Mead of *The Quest Society, London*, given in the last section, will show how Yoga is being exploited in the West. If this exploitation is to be stopped, we Indians must come forth and tell the world what real Yoga is and how it can stand the searching tests of present day sciences. We must critically examine Yoga in all its aspects. If, however, instead of doing this, we were to neglect the physiological side of Yoga, and also to indulge in free speculation and call it a scientific interpretation of the spiritual aspect of it, we shall never be able to stop the mischief that is being done in the West in the name of Yoga.

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A few of the critics of our journal look to be under the impression that the practices discussed by us are dangerous, especially if they are undertaken in the absence of personal guidance. Undoubtedly there are some Yogic exercises which cannot be done save under direct expert supervision. When we come to these exercises we shall not fail to sound a note of warning. Regarding the rest, we humbly point out to our reviewers and readers, that there is nothing dangerous about them, provided the candidate is a man of average mental and physical health, and provided he faithfully follows the instructions given in this journal.

THE editors of a number of very valuable papers and periodicals, both from India and abroad, have arranged to exchange their journals with ours. We have to offer our heart-felt thanks to these friends for the spirit of comradeship they have shown by their action.

WE beg to draw the attention of our readers to the letters printed in the last section. The German letter is from Prof. Dr. Rissom of the Heidelberg University, and tells us that the Germans are taking to exercises similar to those available in Yoga, more than ever before. Everybody knows the success the Germans have achieved in physical culture, and this information from a university professor should convince us of the high value of Yoga as a system of physical culture. One of the American letters is from Dr. Caldwell, the founder of the famous Caldwell Health Home, and states the willingness of a distinguished naturopath to try these Yogic methods in his practice. This will show how Yogic therapeutics can be made attractive even in the West. The line quoted from a letter of Dr. Clare, M. D., Carlton, U. S. A., requires no commentary. Our Indian letters too come from high authorities and are appreciative of our work. We have great pleasure in recording our sense of obligation to these people for having sent us a message of encouragement.

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As suggested in the last issue, we have opened a new section, called Miscellaneous, in this number. As, however, we did not receive for publication any letters of criticism bearing on the problems discussed in the first number, we have printed under this section, press notices and personal appreciations of our journal. It is hoped that this literature will help our readers to better understand the spirit of our work.

Our best thanks are due to the editor of the Bhishagvilāsa for undertaking to give in Marāthī a substance of the articles appearing in the Yoga-Mīmānsā. The magazine is devoted to a study of Āyurveda, and we are sure its readers will very much appreciate this new feature of the periodical. We can assure the public that the substance appearing in the Bhishagvilāsa will be a faithful representation of the original.

We conclude these notes with our sincere thanks to all those lovers of Yoga that have helped us in our work, and have enabled us to do what little we are doing for the spread of Yogic culture.

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The Scientific Section

N. B.—Those of our readers that claim no acquaintance with anatomy and physiology will do well to read the Semi-Scientific Section first.

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SYSTEM OF TRANSLITERATION

Letters, their sounds, and a description of these sounds:—

अ	A	Pronounce	'A'	like	'u'	in	'but'.
आ	Ā	„	'Ā'	„	'a'	„	'far'.
इ	I	„	'I'	„	'i'	„	'pin'.
ई	Ī	„	'Ī'	„	'ee'	„	'feel'.
उ	U	„	'U'	„	'u'	„	'fulsome'.
ऊ	Ū	„	'Ū'	„	'oo'	„	'wool'.
ऋ	Ṛ	„	'Ṛ'	„	'rö'	„	German.
ॠ	Ṝ	„	'Ṝ'	„	„	„	„ with a strong accent.
ऌ	Ḷ	„	'Ḷ'	„	'lö'	„	German.
ए	E	„	'E'	„	'a'	„	'fate'.
ऐ	AĪ	„	'AĪ'	„	'ai'	„	'aisle' but not drawled out.
ओ	O	„	'O'	„	'o'	„	'over'.
औ	AU	„	'AU'	„	'ou'	„	'ounce' but not drawled out.
क	KA	„	'K'	„	'k'	„	'kill'.
ख	KHA	„	'KH'	„	'kh'	„	'ink-horn' or like 'ch' in 'Loch' (Scottish).
ग	GA	„	'G'	„	'g'	„	'girl'.
घ	GHA	„	'GH'	„	'gh'	„	'log-house' or 'ghee'.
ङ	ṄA	„	'Ṅ'	„	'n'	„	'king' or 'link'.
च	CHA	„	'CH'	„	'ch'	„	'church'.
छ	CHHA	„	'CHH'	„	the second 'ch' in 'churchill'.		
ज	JA	„	'J'	„	'j' in 'join'.		
झ	JHA	„	'JH'	„	palatal 'z' as in 'azure'.		
ञ	N'A	„	'N'	„	'n' in 'pinch'.		
ट	TA	„	'T'	„	't'	„	'tub'.
ठ	THA	„	'TH'	„	'th'	„	'pot-house.'

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SYSTEM OF TRANSLITERATION

Letters, their sounds, and a description of these sounds:—

ड	DA	Pronounce	'D'	like	'd'	in 'dog'.
ढ	DHA	"	'DH'	"	'dh'	" 'mad-house'.
ण	NA	"	'N'	"	'n'	" 'splinter' or 'and'.
त	TA	"	'T'	"	dental 't' as in 'thin', or like the French 'T'.	
थ	THA	"	'TH'	"	'th'	in 'thunder'.
द	DA	"	'D'	"	'th'	" 'then'.
ध	DHA	"	'DH'	"	'th'	" 'this'.
न	NA	"	'N'	"	'n'	" 'no'.
प	PA	"	'P'	"	'p'	" 'paw'.
फ	PHA	"	'PH'	"	'ph'	" 'top-heavy', or 'gh' in 'laugh'.
ब	BA	"	'B'	"	'b'	" 'balm'.
भ	BHA	"	'BH'	"	'bh'	" 'hob-house'.
म	MA	"	'M'	"	'm'	" 'mat'.
य	YA	"	'Y'	"	'y'	" 'yawn'.
र	RA	"	'R'	"	'r'	" 'rub'.
ल	LA	"	'L'	"	'l'	" 'lo'.
व	VA	"	'V'	"	'w'	" 'wane'.
श	S'A	"	'S'	"	'sh'	" 'ashes'.
ष	SHA	"	'SH'	"	a strong lingual with rounded lips.	
स	SA	"	'S'	"	's'	in 'sun'.
ह	HA	"	'H'	"	'h'	" 'hum'.
ळ	LA	A dento-lingual pronounced with a little rounding of lips.				

Visarga—Ḥ; Nasalized म् as in संयम—Ṁ;

Nasalized न् as in मीमांसा—Ṅ.

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X-RAY EXPERIMENTS ON UDDIYĀNA

(Continued)

EXPERIMENT III

OBJECT OF THE EXPERIMENT :—

The object of the experiment was to study the behaviour of the colon contents during Uddiyana when the meal had reached the rectum. It was also to note the changes caused by Uddiyana in the normal[1] position of the large bowel.

PREPARATION OF THE SUBJECT :—

The subject was a young boy of sixteen. For years he had suffered from malaria and had a number of complaints about his health. Particular Yogic exercises done regularly for six months had, indeed, set him right. But some of the symptoms continued even after another six months. At the time of the experiments the boy looked quite healthy to all outward appearances. But we discovered during these X-Ray experiments that his appendix was still in a pathological condition, though it had undergone distinct improvement. It may be mentioned here, by the bye, that the subject was given special exercises hereafter, and in a short time the appendix was set right.

On the day previous to the experiment the boy took his usual meal at about 12 noon. His evening food consisted of a cup of milk only. After a sound sleep overnight, he had a clear motion in the morning. The subject went without any food on the day of this experiment till 12 noon, when he was given the opaque meal.

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1 Two radiographs representing the normal positions will appear in the next issue. Till then only those points that are noted in the remarks on skiagrams III and IV may be studied.

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THE MEAL :—

The meal was prepared after Dr. Morton's method. The basis of the meal consisted of a semi-solid preparation of milk. To a substantial cup of this, three ounces of barium sulphate were added with a small quantity of ordinary milk. The subject consumed nearly the whole of it.

THE EXPERIMENT PROPER :—

The meal was administered at 12 noon. The subject practised one round of Nauli at 12-15 and another at 12-30. Skiagrams showing the position of the intestinal contents just after these rounds, will be published in the next issue. After the second round it was noted that the meal had already reached the rectum. The boy was then asked to practise Uddiyana. Radiograph III represents a chart of the intestines during this exercise. Here the student was given exactly the same pose as in Experiment II described on p. 20 in the last issue.

NOTE—

Radiographs printed in this issue were all originally of 12″ × 10″. They have been subsequently reduced to 6″ × 5″ size for the convenience of this journal.

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REFERENCES TO RADIOGRAPH III

1 The Right Iliac Bone.

2 The Twelfth Ribs.

3 The Twelfth Dorsal.

4_1 The First Lumbar.

4_2, 4_3, 4_4, 4_5 The Successive Lumbar Vertebræ upto the Fifth.

5 The Appendix.

6 The Upper Half of the Ascending Colon.

7 The Hepatic Flexure.

8 The Transverse Colon.

9 The Splenic Flexure.

10 The Descending Colon.

11 The Sacrum.

12 The Small Intestine.

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Radiograph III

Fig. XXX

Position of the Colon and its Contents during Uḍḍiyāna
When the Meal had reached the Rectum.

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X. 21

POINTS OF STUDY :—

1—(a) The appendix is in a pathological condition.
(b) Therefore it casts a shadow.
(c) Its location shows that it is considerably raised from its normal position.
(d) It can, therefore, be inferred that the cecum is also raised higher still.

2—(a) There is a break in the shadow just above the appendix.
(b) The blank shows that the cecum is empty.
(c) The cecal contents seem to be drawn up in the ascending colon.

3—(a) The blank above the appendix is larger than an empty cecum would cause.
(b) It seems, therefore, that the lower part of the ascending colon is also empty.
(c) Taking into consideration the average comparative lengths of the cecum and ascending colon, it seems that the empty part of the latter is probably nearly half of its total length.

4—(a) The upper half of the ascending colon casts dark shadows.
(b) Because it is full of barium.
(c) The inclination of the upper part of the ascending colon shows that the whole of it is drawn towards the spinal column during Uddiyana.

5—(a) The transverse colon also casts very dark shadows.
(b) Because barium from the empty parts of the colon looks to be gathered there.
(c) It is thrown into an arc lying above the twelfth dorsal.

6—(a) The splenic flexure also casts very dark shadows.
(b) Because it is full of barium.
(c) The transverse and the descending colons do not appear to make any angle at the splenic flexure.

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7 — (a) The upper part of the descending colon also casts shadows.

(b) Because this also contains barium.

(c) What part of the descending colon is empty cannot be very accurately inferred, because the faint shadows marked by the figure 12 have rendered any inference doubtful.

(d) See point 1 of the supplement below.

8 — (a) The shadows marked by the figure 12 are cast by the small bowel.

(b) Because though through the action of Nauli the barium meal has reached the rectum, parts of it are still lingering in the small intestine.

9 — The shadows of the sacrum are made darker by the barium in the neighbouring folds of the small intestine.

10 — (a) In the original radiograph the space occupied by the first four lumbar vertebræ is 5·75".

(b) In the case of the subject selected for this experiment, these vertebræ normally occupied 5·5". (A radiograph representing normal condition of the subject at the time of this experiment, will be published in the next issue of this journal).

(c) The difference of nearly 4·5 per cent in the two measurements is due to a stretch given by the upward pull of the back muscles during Uddiyāna.

THE SUPPLEMENT :—

1 — The contents of the descending colon and the sigmoid were observed being drawn up on account of the action of Uddiyāna.

2 — The barium meal gathered in the transverse colon and the nearest parts of the ascending and descending colons,

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X-RAY EXPERIMENTS ON NAULI

EXPERIMENT I

OBJECT OF THE EXPERIMENT :—

The object of the experiment was to study the behaviour of the colon contents during Nauli-Madhyama—the central aspect of Nauli—when a meal had reached the rectum. It was also to note the changes caused by Nauli-Madhyama in the normal position of the large bowel.

PREPARATION OF THE SUBJECT AND THE MEAL :—

As the boy was taken up for this experiment directly after Experiment III on Uddiyana (p. 86), these points do not require any additional remarks.

THE EXPERIMENT PROPER :—

Radiograph IV was taken during Nauli-Madhyama as the subject was lying in the same position that he had assumed during experiments on Uddiyana. The usual poses illustrated in Figs. X and XI of the first issue did not serve the radiographic purpose. Hence the change in position. This change, however, has not affected the results.[1]

[1] See foot-note to p. 86.

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REFERENCES TO RADIOGRAPH IV

1 The Right Iliac Bone.
2 The Twelfth Ribs.
3 The Twelfth Dorsal.
4_1 The First Lumbar.
4_2, 4_3, 4_4, 4_5 The Successive Lumbar Vertebræ upto the Fifth.
5 The Appendix.
6 The Cecum
7 The Ascending Colon.
8 The Hepatic Flexure.
9 The Transverse Colon.
10 The Splenic Flexure.
11 The Descending Colon.
12 The Sigmoid.
13 The Small Bowel.

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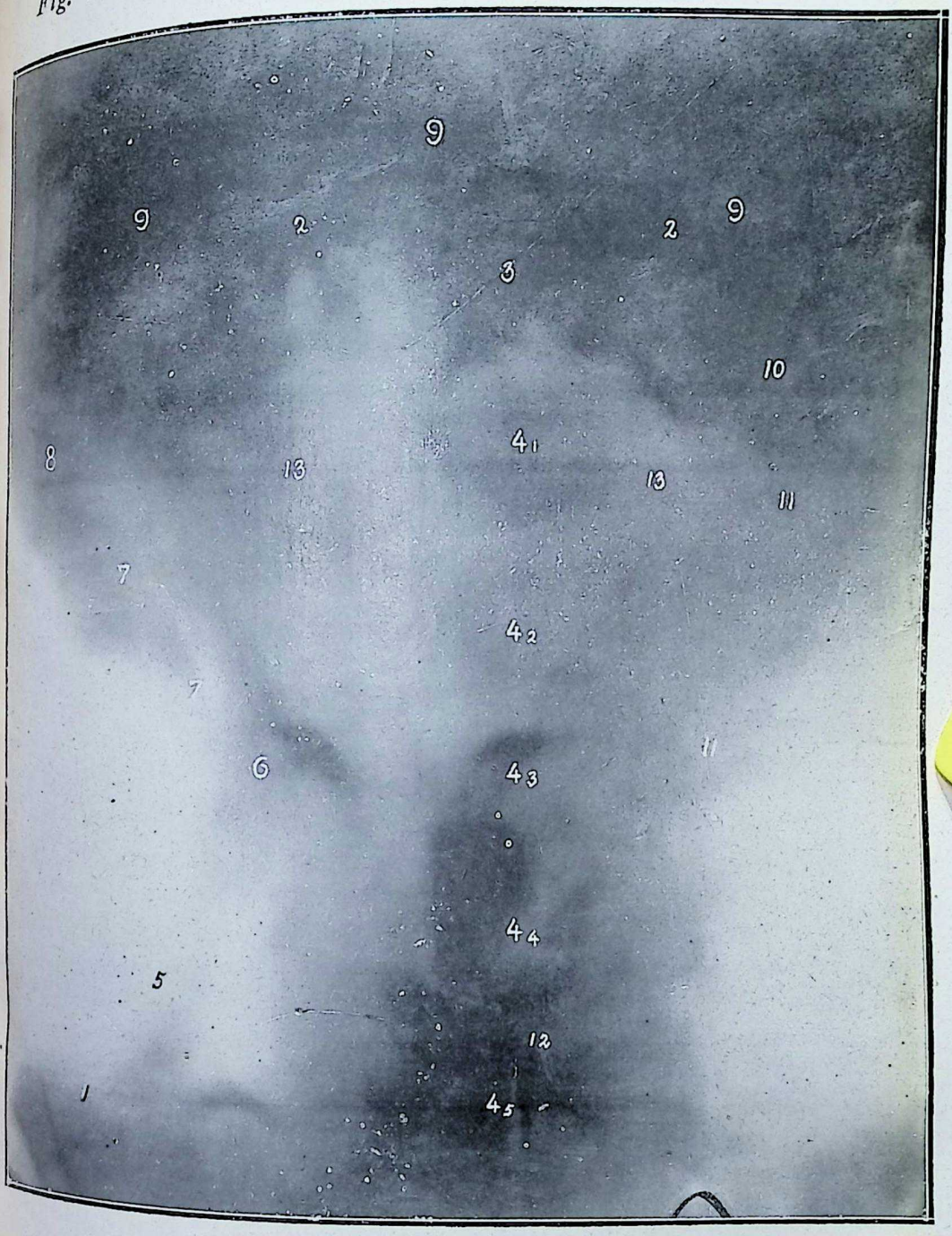
Fig. XXXI *Radiograph IV*



Position of the Colon and its Contents during Nauli-Madhyama
When the Meal had reached the Rectum.

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No. 21

POINTS OF STUDY:—

1—(a) The appendix casts a faint shadow.
(b) It seems to be in a pathological condition.
(c) Its location shows that it is raised from its normal position.

2—(a) Shadows marked by the figure 6 look to be cast by the cecum.
(b) Because they are broader than those of the appendix.
(c) They are not deep and suggest that the contents are not in a thickly concentrated condition.
(d) The cecum appears to be considerably raised from its normal position.

3—(a) Average comparative lengths of the ascending colon and the cecum suggest that the shadows marked by 7 are cast by the ascending colon.
(b) These are darker than the shadows of the cecum and show greater concentration of the contents.
(c) The appendix, cecum and ascending colon are drawn towards the spine; and arrange themselves in a curve that makes the nearest approach to the vertebral column at the commencement of the ascending colon.

4—(a) The hepatic flexure casts deep dark shadows.
(b) Because it contains barium in a highly concentrated form.

5—(a) Darkest shadows are cast by the transverse colon.
(b) A part of the barium from the ascending and descending colons has been drawn up here, and the concentration of the bowel contents is consequently the greatest.
(c) The transverse colon is thrown into an arch curving round the twelfth dorsal.
(d) It does not make an angle either with the ascending or with the descending colon.

6—(a) The splenic flexure casts deep dark shadows.
(b) Because it contains barium in a highly concentrated form.

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7 — (a) In the descending colon the contents appear to be thinly distributed.

(b) Because they cast only light shadows.

(c) The curve given to the descending colon in Nauli is more pronounced than the curve of the ascending colon. The lower part of it is almost in front of the spine.

8 — (a) The sigmoid looks to be drawn completely before the spine.

(b) *In all probability* its shadows are darker than those of the descending colon.

(c) Being overshadowed by the spine it affords little opportunity for observation.

9 — (a) The shadows marked by the figure 13 are cast by the small bowel.

(b) Because though through the action of Nauli, the barium meal has reached the ractum, parts of it are still lingering in the small intestine.

10 — (a) In the original rediograph the space occupied by the first four lumbar vertebræ is 5·25″.

(b) In the case of the subject selected for this experiment, these vertebræ normally occupied 5·5″. (A radiograph representing normal condition of the subject at the time of this experiment, will be published in the next issue of this journal.)

(c) The difference of nearly 4·5 per cent. in the two measurements, is due to a push given to the vertebræ concerned by the downward thrust of the back muscles during Nauli.

(d) The same student is subjected to this and the previous experiments. Thus an opportunity to compare the condition of the lumbar region during the two exercises of Uḍḍiyāna and Nauli is available. A comparison

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between 10—(a) of the last page with 10—(a) of p. 90, shows that the downward thrust of Nauli after Uddiyana effects a reduction of 8·7 per cent. in the space covered by the upper four lumbar vertebræ.

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MĀDHAVADĀSA VACUUM

Our experiment proving the creation of the Mādhavadāsa Vacuum has already been given in the last issue. The anti-peristalsis hypothesis was also discussed there. Now we propose to examine this hypothesis still further and also to give our view of the genesis of the Mādhavadāsa Vacuum.

THE ANTI-PERISTALSIS HYPOTHESIS

The rise of water through the rectal tube during Basti is so conclusive an evidence that further argumentation to refute this hypothesis might look unnecessary. Still there remains the possibility of the rise of water being due to the combined action of anti-peristalsis and the Mādhavadāsa Vacuum. The partial vacuum may be responsible for raising water through the rectal tube, nay, even through the descending colon; but from the end of the transverse colon the fluid is controlled by anti-peristalsis and taken backward.

There is experimental evidence available to show that anti-peristalsis occurs when enemas are administered. It has been observed by Cannon in the case of cats. The waves of contraction started from the splenic flexure and travelled backwards driving the fluid to the cecum.

We shall presently prove that even this anti-peristalsis is absent in the case of Nauli. But supposing that it is present, it cannot prove Nauli to be unnatural as anti-peristalsis is quite usual in these regions. Dr. Hurst has observed this phenomenon occuring in these parts of the colon in a series of experiments carried out upon healthy men.

But really speaking whether usual or unusual, no anti-peristalsis occurs during Nauli in any part of the colon. We have X-Ray evidence to prove our statement.

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No. 3]

Radiograph IV represents the condition of the colon contents during the central aspect of Nauli. In Basti this very aspect is used to draw water into the colon. The external appearance of the abdomen during this aspect is illustrated in Fig. XI in the last issue. Now if Radiogragh IV is examined, it will be found that the contents are thickly crowded in the transverse colon, whereas their distribution in the ascending colon and cecum is thinner. This would not have been the case if the contents were under the grip of anti-peristalsis. The concentration in the cecum would have been the greatest and that in the transverse colon less. For to explain the force with which water is driven into the colon during Basti, we must assume a very powerful anti-peristalsis ; and this would drive the liquid back to the cecum which would consequently be fuller than the transverse colon. But the facts as they are noted above, are just otherwise; and require us to admit the absence of anti-peristalsis during Nauli.

It may be pointed out here to the opponents of the anti-peristalsis hypothesis that no evidence has been upto now adduced to show that the sigmoid and the descending colon remain free from the anti-peristaltic action during Nauli. We have to admit that no experimental evidence of a *conclusive* character has been gathered upto now in this regard. But even here we have some evidence that may prove our position with probability though not with certainty. A reference to Radiograph IV will show that *in all probability* the sigmoid is more crowded with barium than the descending colon. Now under the anti-peristalsis hypothesis this would be absurd. On account of the anti-peristaltic action the contents of the sigmoid should have been driven to the descending colon. At any rate the latter should have been fuller than the former. But *in all probability* it is not, and proves the absence of anti-peristalsis even in these sections of the colon.

Although our experimental evidence is weak, reason is strongly for us. Does it stand to reason to suppose that the practice of Nauli induces anti-peristalsis exactly where it is

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unnatural, when it does not start that action in parts where it is quite normal? We are sure that the answer will always be in the negative.

Thus the anti-peristalsis hypothesis being ruled out of court and the vacuum theory being experimentally proved, it remains to be explained as to how the Mādhavadāsa Vacuum is created.

THE GENESIS OF THE MĀDHAVADĀSA VACUUM

In order that the genesis of the Mādhavadāsa Vacuum may be clearly understood it is necessary to remember a few physiological facts about the colon.

Fermentation is ever going on in the large bowel, especially in the cecum and the ascending colon. During these fermentative processes quantities of carbon dioxide and other gases are constantly liberated and accumulate in the colon causing its dilation. These facts are often observed during operative work. If portions of bowel enclosed within the grasp of intestinal clamps are unclean, the local contents set free carbon dioxide and other gases which being unable to escape, distend the bowel wall. But if the intestinal portions are cleaned, the enclosed bowel remains in a collapsed condition, as no gases are produced there.

Under these circumstances the perpetual production of these gases would have so distended the bowel that it would have soon gone out of use. But an arrangement is made to remove these gases and to reduce their intestinal quantity to a comfortable measure. The colon is internally lined with the mucous membrane. Behind this membrane are blood vessels that supply and drain the bowels. Thus the partition between the blood stream circulating through these vessels and the gases accumulating in the colon, is so thin that the gases find their way to the blood stream, and are carried away with it, especially with the venous blood. The physical laws governing this absorption of gases need not be discussed here. But the

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clinical evidence proving the particular character of gaseous absorption may be noted in passing.

Whenever the blood supply of a particular portion of the colon is interfered with, there occurs an acute dilation of the organ in the parts concerned. This is best observed in cases of *thrombosis* (coagulation of blood) of the colic veins. The conclusion is clear. Venous blood flow being stopped, the gases do not find their way to escape and with an ever increasing accumulation distend the affected parts. The same results may be experimentally produced. We quote the very words of the author of these experiments.

"If an animal's abdomen is opened and the main veins of a section of the colon are ligatured or clamped, so that the venous flow from that portion of the colon is entirely arrested, and the abdomen is again closed, it will be found in an hour or two, if the abdomen be reopened, that this portion of the colon has become considerably dilated. The affected portion of the colon is found to be dusky in colour and much distended with gas. If some of the gas is removed with a clean glass syringe and tested it is found to be principally carbon dioxide."

This arrangement of reducing the gaseous pressure in the colon is so complete that in healthy persons gases are kept very comfortably controlled. In our experiments with the barometer we invariably found them just counterbalancing the atmospheric pressure. We by no means want to suggest that the gases maintain uniform pressure throughout the colon. Our data are yet too insufficient to authorize any such conclusion. We have simply stated our experience.

Now the condition of the colon partially or fully collapsed or otherwise, will depend upon the relative pressures exerted upon it by its contents including gases, from inside and by the abdominal walls and other abdominal viscera from outside. The volume of the colon gases will depend upon the space they are allowed in the colon. If the space is reduced, their volume will decrease; but according to Boyle's law, their pressure will

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increase proportionately. If, however, the space is enlarged, their volume will increase but their pressure will decrease in due proportion. In both the cases it is understood that other circumstances continue to be the same. Now if on account of the increased volume of gases, their pressure in the colon grows lower than that of the atmosphere, vacuum will be created in the colon.

This is exactly what happens in the exercise of Nauli. The isolation of the recti and elevated position of the diaphragm increase the capacity of the abdomen. This increased capacity reduces the intra-abdominal pressure and allows the colon to dilate under internal gas pressure. Thus the volume of the intestinal gases is increased leading to a proportionate decrease in their pressure. This decreased pressure causes the barometer to fall when connected with the colon during Nauli and indicates the Mādhavadāsa Vacuum.

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BASTI

or

YOGIC FLUSHING OF THE COLON

A reference to this practice has already been made in the last issue of this journal. (Vide p. 26). Basti is the act of flushing the colon by means of Nauli with or without the help of a rectal tube.

TRADITIONAL TECHNIQUE:—

A student was admitted to the course of Basti in old Yogic schools, only after he had been well established in the practice of Nauli. This was necessary to avoid the possible retention of water in the large bowel after flushing. By prolonged abdominal exercises such as Nauli and others, the colon gets toned up, the abdominal walls become strong, the expulsive power of the colon and the rectum largely improves. Thus almost the whole quantity of water taken in is ejected, and there is left no chance of the retained water damaging the bowel. When the master saw that the required stage had arrived, the pupil was taught how to prepare a rectal tube. A hollow piece of tough bamboo stick with a bore of nearly three-eighth of an inch in diameter, was selected. By chopping off the thick walls of this cylinder and reducing its length, it was turned into a smooth tube, four inches in length, having a thin wall of one-sixteenth of an inch in thickness. The two ends were well rounded off. We have personally made use of such a tube and from our experience we can say that it is quite comfortable an article.

In olden days Basti was practised generally by the riverside. The student stood in the clear water of the stream so deep as to reach the umbilicus, and held himself in readiness for Nauli with a slight forward bent of his trunk. Then the tube was well lubricated, generally with ghee, and slowly introduced into the rectum. Nearly one-third of it was kept out and only

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two-thirds were inserted. Then followed the isolation of the recti (Nauli-Madhyama), as shown in Fig. XXXVII. With this water rushed into the colon. No rolling manipulations of the abdominal muscles were to be undertaken. The recti were to be maintained in their isolated position as long as possible. When the breath could no longer be held out, the tube was slowly extracted from the rectum and the anal sphincters were closed. Normal respiration was then allowed to start.

At this point the student left the stream and took his stand upon the sandy bank of the river. Here he tried to retain water as long as he could. In the meanwhile, however, he kept himself quite busy practising Nauli, complete rolling manipulations being made. When ejection would become imperative, the pupil allowed his bowels to be unloaded with a stoop. If any quantity of water was left behind, another round of Nauli would be quite competent to expel the same. If the lingering liquid should prove to be obstinate the Peacock Pose (Fig. XXXIII), was practised and the undesirable fluid got rid of. The rectal piece was dispensed with when the student could open his rectum by means of muscular action alone.

MODERN CHANGES IN THE TECHNIQUE:—

The principal features of the traditional technique will continue to be the same, perhaps, for ever, because they are so wonderfully perfected. Some of the minor aspects, however, require a change in order that they might suit modern requirements. Modern civilization has resulted in concentration in large cities making a riverside life almost impossible. Even in India where yet a majority of population inhabits villages, repeated famines have so affected river currents that a clear running stream flowing over a sandy bed and having the required depth has become a scarcity. Under these circumstances the use of a large tub has become almost common in India. This again is full of difficulties, and appears prohibitive to people residing in small rented rooms in cities like Bombay. We recommend small enamelled trays as a very convenient substitute for the unwieldy tubs. The trays should be just large and deep enough to allow

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the anus to be dipped an inch below the water surface. As the water rises into the colon on account of a partial vacuum created in it, deeper water is not at all wanted for Basti. A bed-pan or commode may be used for unloading the bowels, or the usual latrine arrangements may be taken advantage of. When a tray is used for holding the original clean water, it is unnecessary to point out that Basti can be practised only in a squatting posture as shown in Fig. II in the first number.

The rectal tube of bamboo may also be advantageously replaced by a tough rubber tube. The vaginal piece generally supplied with the modern enema with its top removed, serves a good purpose.

Many students of Yoga look to be under the impression that the larger the quantity of water sucked up the better is the bowel flushed. To our mind this impression is somewhat inaccurate. Yogic Basti is so perfect that even a pint of water can be spread over the whole colon and ejected with the other bowel contents. In pathological conditions, when one flushing does not satisfactorily clear the large intestine, two flushings may be attempted at half an hour's interval with small quantities of water. Very large quantities have the disadvantage of distending the bowel without any corresponding advantage. Yogic Basti provides an automatic check, inasmuch as it allows only a measured quantity of water to flow in.

Again Yogic tradition required students of Basti to be very careful about their diet. Only the noon meal was allowed and that too of rice and a particular kind of pulse. Ghee was prescribed but very sparingly. Large quantities of buttermilk were recommended. The motive was to render the colon as sterile as possible and to prevent the least possibility of auto-intoxication.

Now when Basti is practised as a preventive measure, this strict dietary need not be followed. Still it is desirable that the evening meal is light and all irritants are avoided. When, however, Basti is adopted as a curative agency, the old prescription is likely to be very useful.

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NOTE—

Morning is the best time for Basti. It is practised after the normal motion of bowels. No food is allowed before this flushing, because the exercise of Nauli which forms an essential part of Basti so much stimulates the intestines, that owing to the peristalsis which it sets in and the pressure it exerts, food is hurried on through the alimentary canal without being digested. This point will be discussed with radiographic evidence in the next issue. If Basti is at all to be practised in the evening or at night some six hours should be allowed to go by after the last intake of food.

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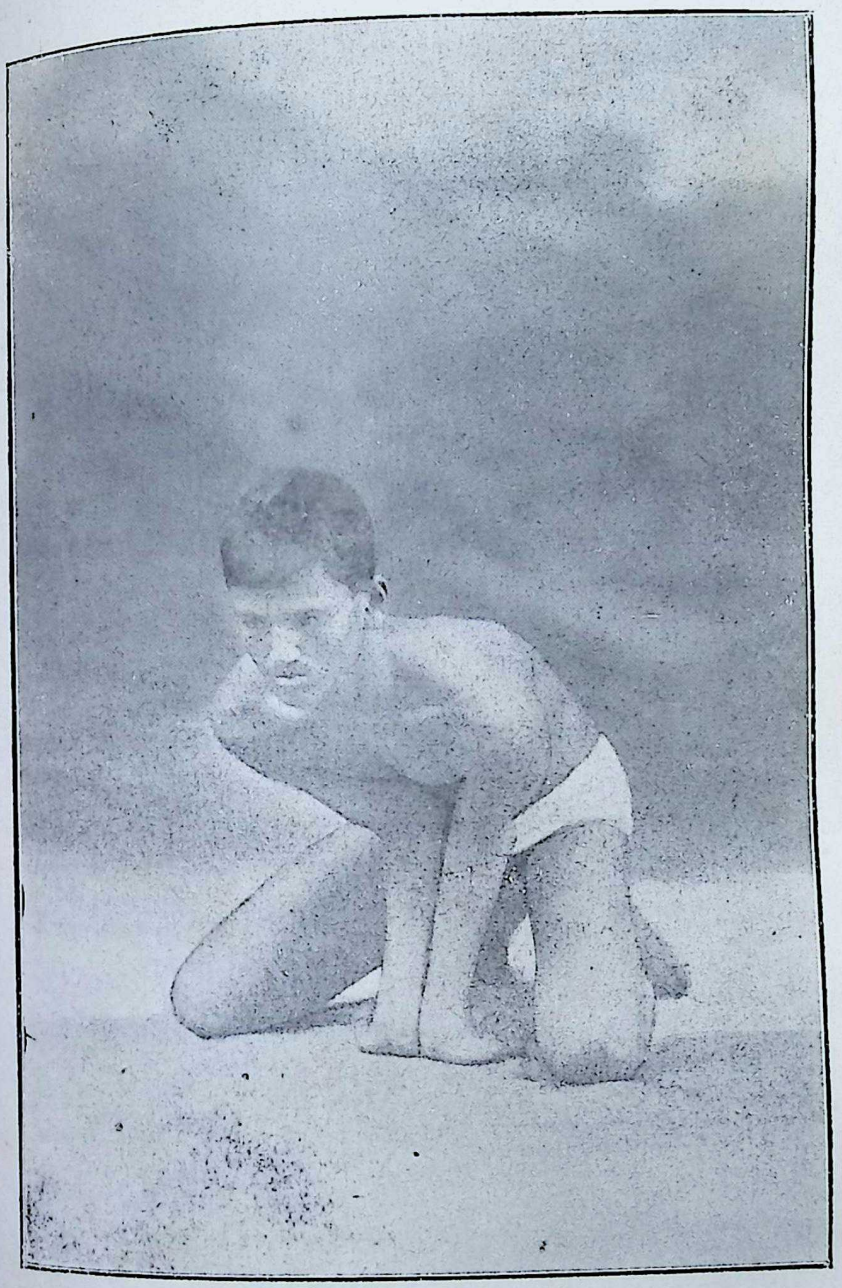
Fig. XXXII



Preparation for Mayūrāsana.

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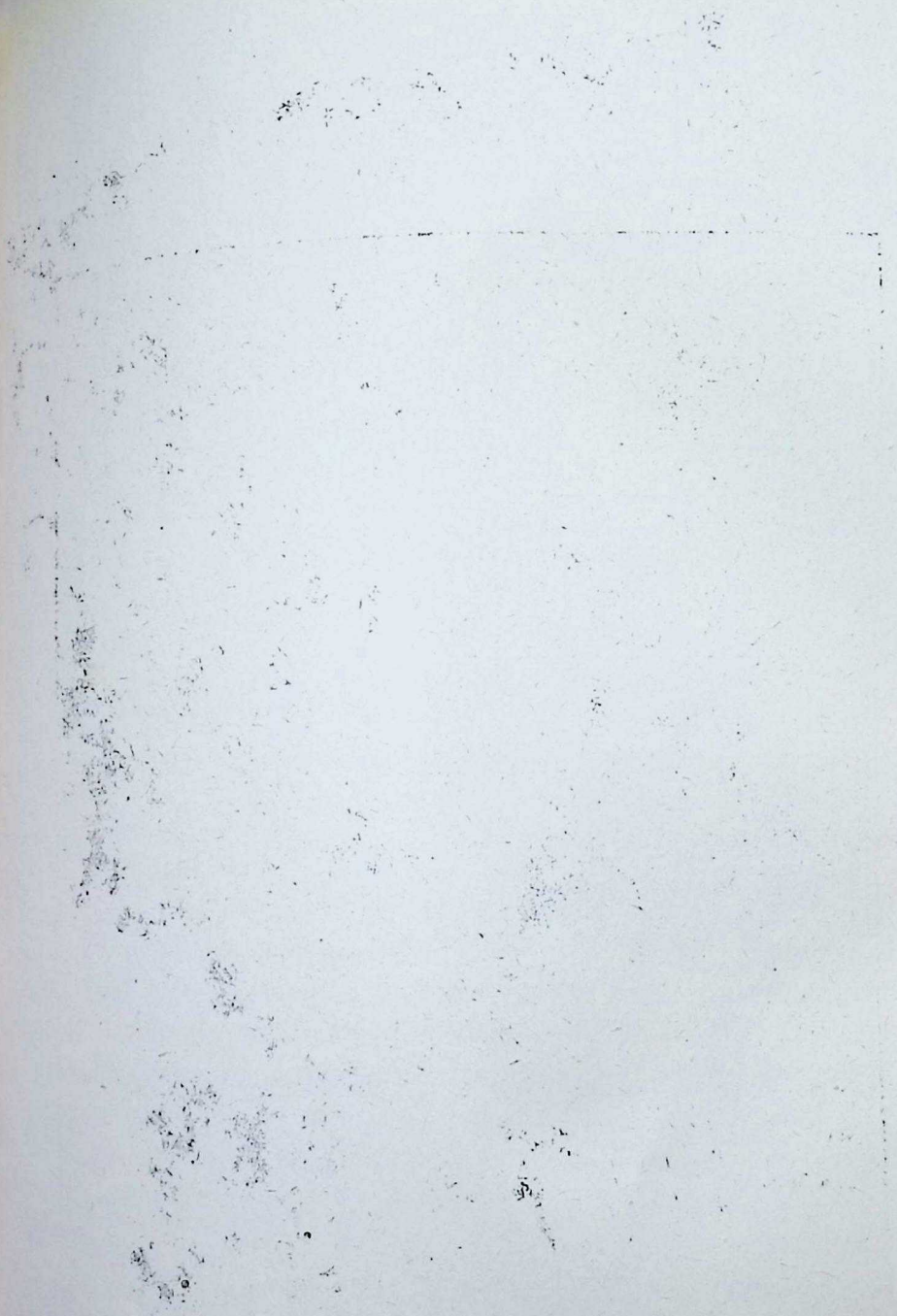

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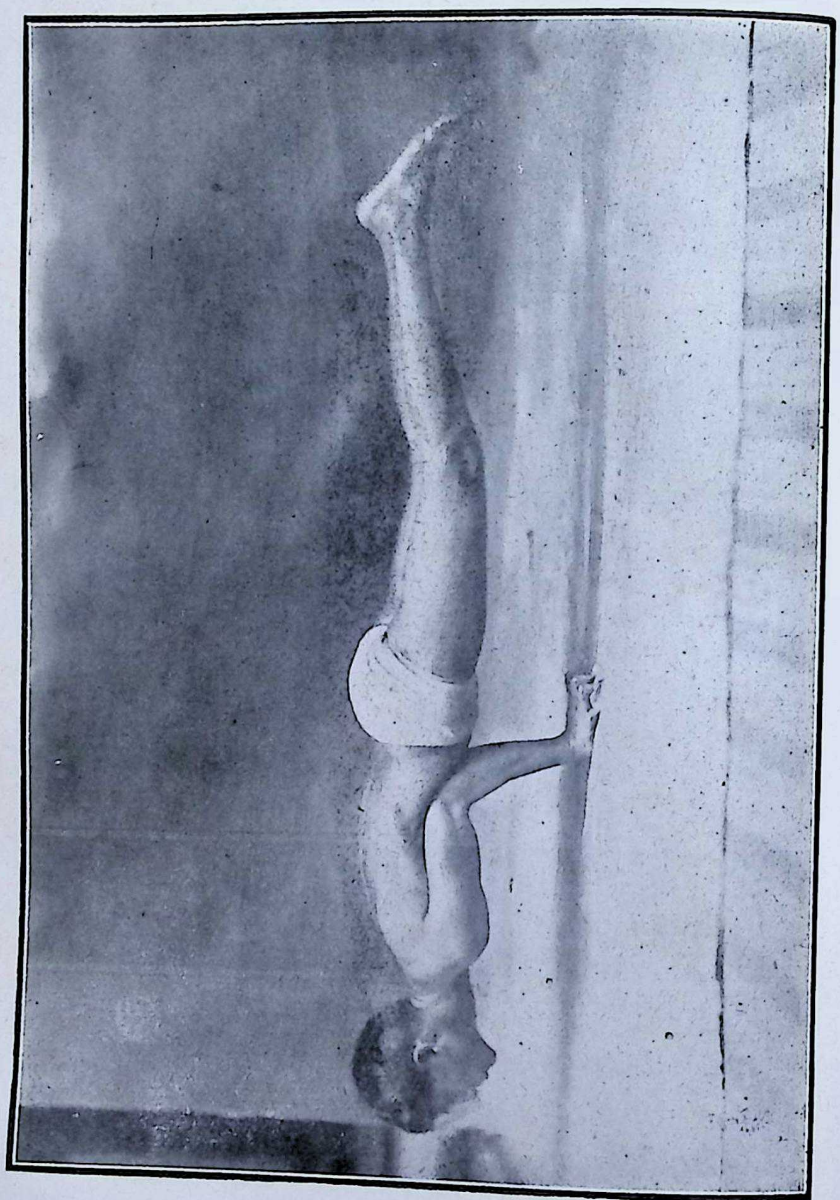
Fig. XXXIII



Mayūrāsana or The Peacock Pose.
(Side view)

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MAYŪRĀSANA

or

THE PEACOCK POSE

THE NAME :—

This pose is called Mayūrāsana because it imitates the deportment of a peacock with its heavy plumage stretching behind him. Mayūra means a peacock.

THE TECHNIQUE :—

To start with the student kneels on his seat and brings together his forearms down upto the wrists. The elbow-joints are put in close contact with each other so that they, provide a suitable fulcrum to support the horizontal body, during the full display of the pose. The palms and fingers are made to stand for the feet and claws of the peacock. Their position, however, is reversed, the palms being given a backward direction. It is needless to say that the fingers afford a very good contrivance for adjusting the balance. (Vide Fig. XXXIII).

Mayūrāsana or The Peacock Pose. (Side view)

On the fulcrum thus prepared the body is stretched out in a straight line parallel to the seat. The elbows are placed on the abdomen just below the umbilicus. The forearms do not stand exactly at right angles with the ground, but are a little inclined to the front. The head is raised and the chin thrown out in order to counter-balance the heavy legs. The whole body is held like a bar resting on a fulcrum. (Vide Fig. XXXIII).

A beginner should hold his breath so long as the pose lasts. Quite an amount of muscular energy is required

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for this exercise, especially in the beginning; and this energy can best be had with controlled breath. But as the practice advances and the muscles get into the habit of doing this type of work, less energy is needed; and then breath may be allowed to flow as usual even during the exercise.

As a complement of Basti the pose requires a change in the technique. The legs, instead of being held together and parallel to the ground, are to be spread out and raised imitating a proud display of the peacock's plumage.

The change has a physiological purpose to serve. Parallel and horizontal legs require the glutaeus maximus[1] and the levator ani[1] to be fully contracted. The internal anal sphincter is also tightly closed. This is quite desirable when the pose is to be practised for itself, because it helps to increase the intra-abdominal pressure which is one of the advantages sought in Mayūrāsana. But when the exercise is done as a sequel to colon flushing, its aim is to drive out the lingering liquid from the large bowel. This requires the levator ani and the anal sphincter to be in a relaxed condition. In order to make this relaxation possible the legs are spread out. It is to be remembered that the glutaeus maximus remains contracted even in this condition. The contraction of the glutaeus with a simultaneous relaxation of the levator ani, requires some practice in muscle control. In traditional Yogic schools students are not allowed to practise Basti unless they master this essential technique.

NOTE—

Points of study will be noted on some other occasion when this pose will be taken up for independent treatment. Here it is given only as a complement of Basti.

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1 See foot-note on p. 144.

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The Semi-Scientific Section

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N. B.—Instruction in Yogic culture higher as well as lower will be given gratis at the Āś'rama to everyone that earnestly seeks it.

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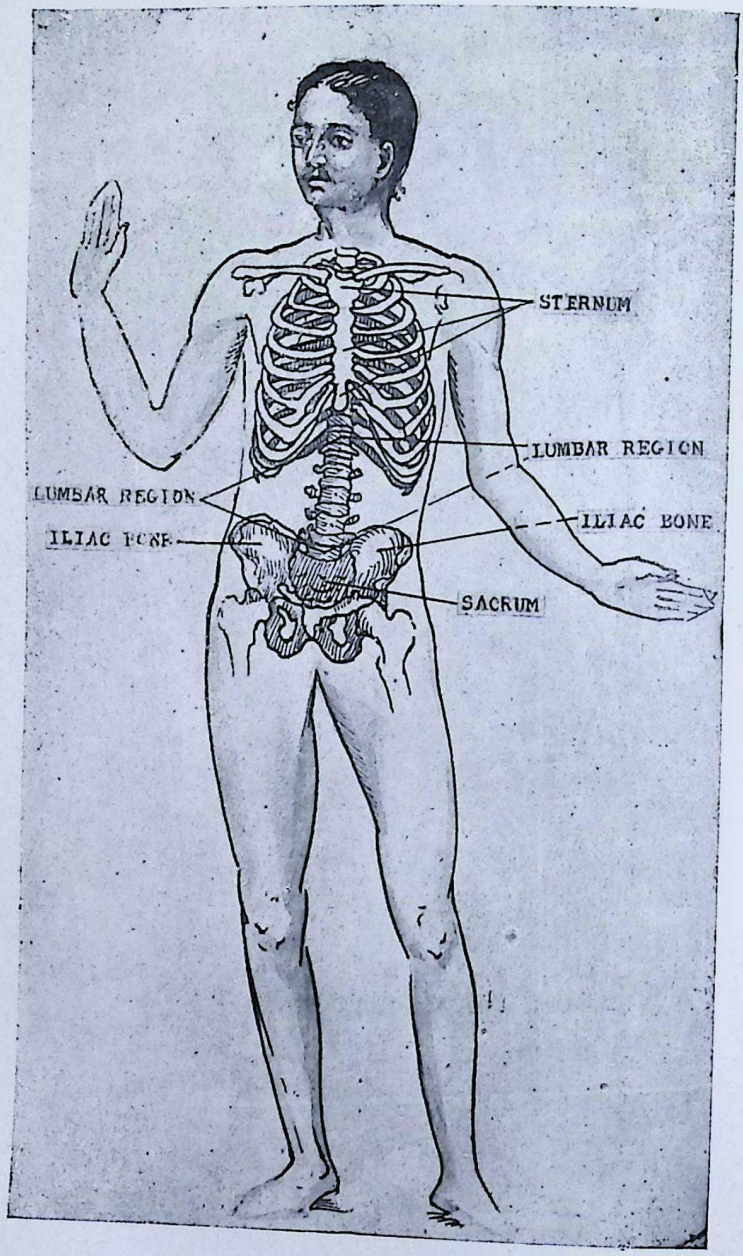
Fig. XXXIV



The Trunk.

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A NOTE ON THE ABDOMEN

THE ABDOMEN

We have already referred to the vertebral column in the last issue of this journal. This column of bones supports in its front, directly or indirectly, two great cavities of the human body. The upper is called the chest or thorax and the lower is called the belly or abdomen. The thorax consists of the twelve dorsal vertebræ behind, of twenty-four ribs, twelve on each side, which spring from the vertebræ behind and arch forward, and of the breastbone or sternum. (Fig. XXXIV). These bones are covered over with muscles and other soft tissues; and comfortably hold within their limits the heart, the lungs, etc. Thus the organs situated in the thorax are protected by bones on all sides except at the bottom where a big muscle, called the diaphragm, forms the floor. Unlike the thoracic part, the abdominal cavity is poorly supplied with bony protection. The hip-bones below and the slender vertebral column behind are the only bones that support the abdominal cavity. (Fig. XXXIV). The walls of the abdomen are composed of muscles all round, and the roof also consists of the muscle diaphragm which divides the two biggest cavities of the human body. Thus it will be seen that the abdominal walls consist of a muscular structure only indirectly supported by the ribs above and the hip-bones below. The abdominal muscles will be presently studied in detail. But the point to be specially emphasized here is that the cavity is mainly surrounded by muscular coats which perpetually press upon the organs, such as the intestines, the spleen, the liver which they hold within them. The diaphragm which is a respiratory organ, descends upon the abdominal viscera with every inspiration and constantly adds to the intra-abdominal pressure exerted by the outer muscular walls.

MUSCLES OF THE ABDOMEN

Only those muscles that play a prominent roll in determining the health of the abdominal viscera, will be noticed here. They

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are the diaphragm which covers the top of the abdomen; the iliacus, (Fig. XXXIX), obliquus externus, obliquus internus, tranversus, (Fig. XXXV), and rectus, (Fig. I of the current volume), which stand at the sides and in front of it; and the psoas major, psoas minor, and quadratus lumborum which lie behind it. (Fig. XXXIX). Now we shall take up these muscles either singly or in groups, and study their actions.

The Diaphragm is a dome-shaped muscle which separates the thoracic from the abdominal cavity, its convex upper surface forming the floor of the former, and its concave under-surface the roof of the latter. Roughly speaking this muscle is attached to the bony walls of the chest. It has a special hold upon the upper lumbar region, the back muscles of the abdomen, and the transversus abdominis. Being an important respiratory organ, it is ever rising and falling with the movements of the breath. Under these circumstances, however, the curvature of the diaphragm is scarcely altered, the dome moving downwards nearly parallel to its original position and pushing before it the abdominal viscera. The descent of these viscera is permitted by the extensibility of the abdominal wall. In all expulsive acts the diaphragm is called into action to give additional power to each effort. Thus before sneezing, coughing, laughing or vomitting, and previous to the expulsion of urine or fæces or of the fœtus from the uterus, a deep inspiration takes place.

The obliqus externuus, obliquus internus and transversus are the three flat muscles situated on the lateral and anterior part of the abdomen. They are placed below one another and together form the three muscular coats of the abdominal wall. There are two sets of these, one on the right and the other on the left side of the body. The obliquus externus is the largest and the most superficial of the three. (Vide Fig. XXXV). Below it lies the obliquus internus which is thinner and smaller than the one above it. The innermost is the transversus which almost completely encircles the abdominal cavity. Broadly speaking the three muscles are attached to the ribs above and hip-bones below. Their actions

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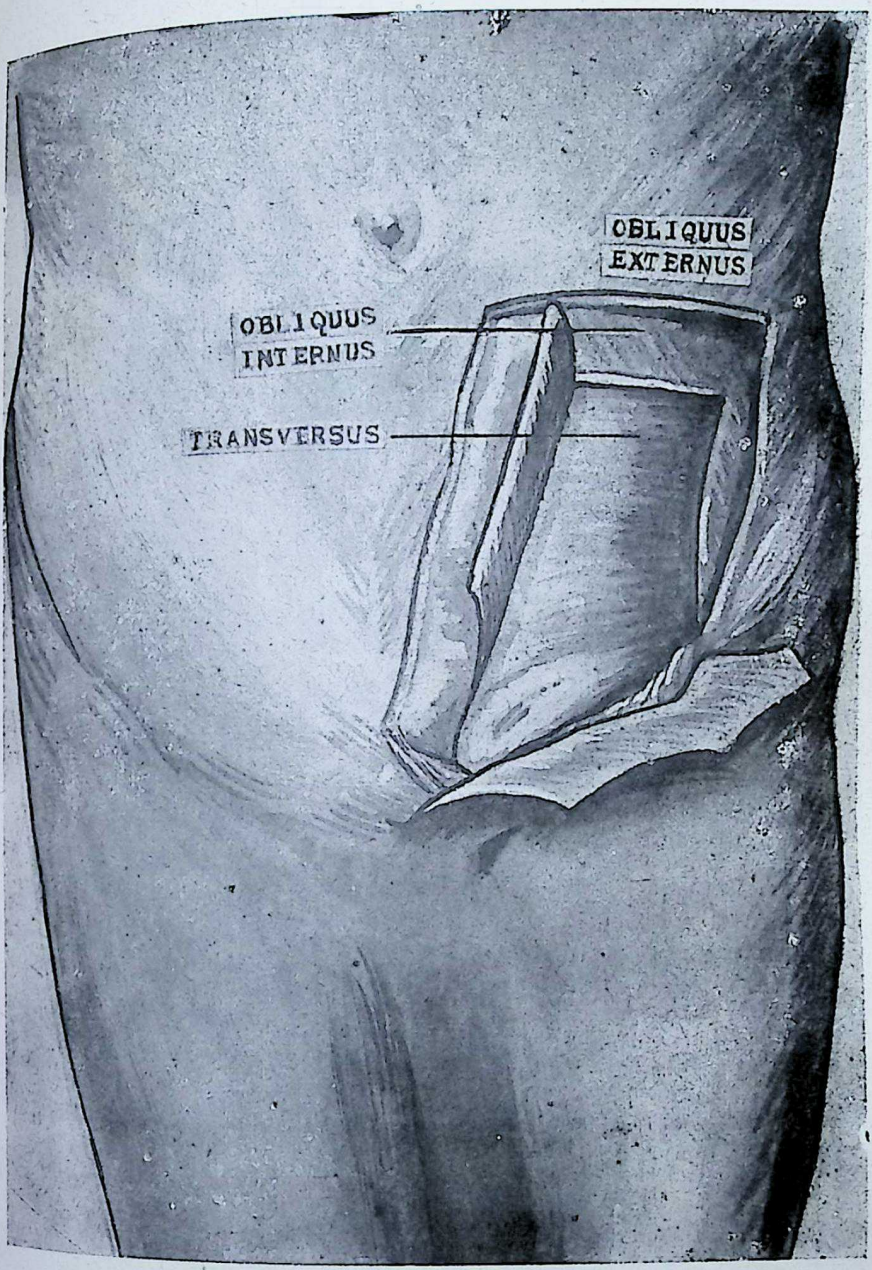
Fig. XXXV



The Three Flat Muscles of the Abdomen
Standing at the Sides and in Front.

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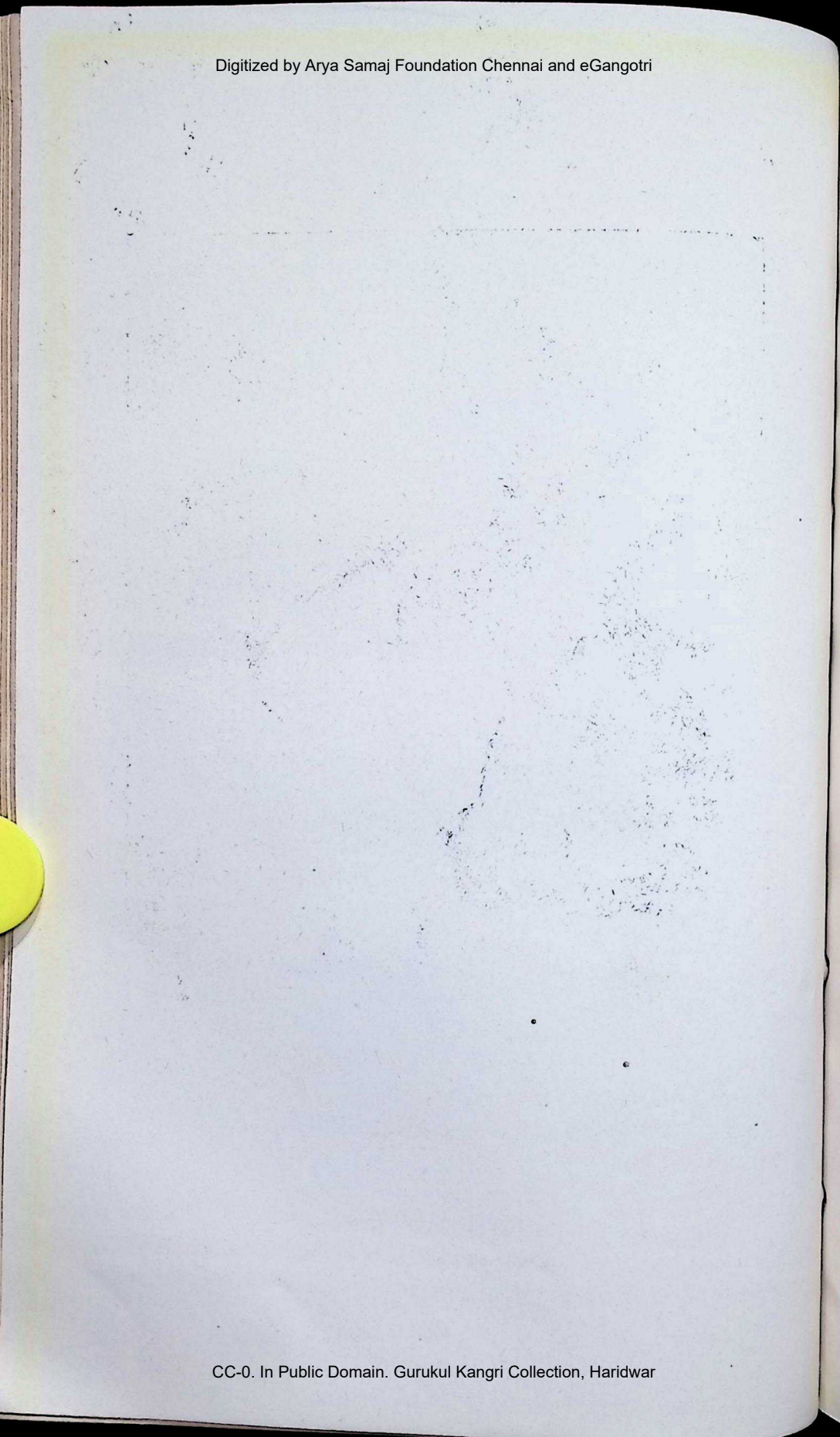

Fig. XXXVI Fig. XXXVII Fig. XXXVIII

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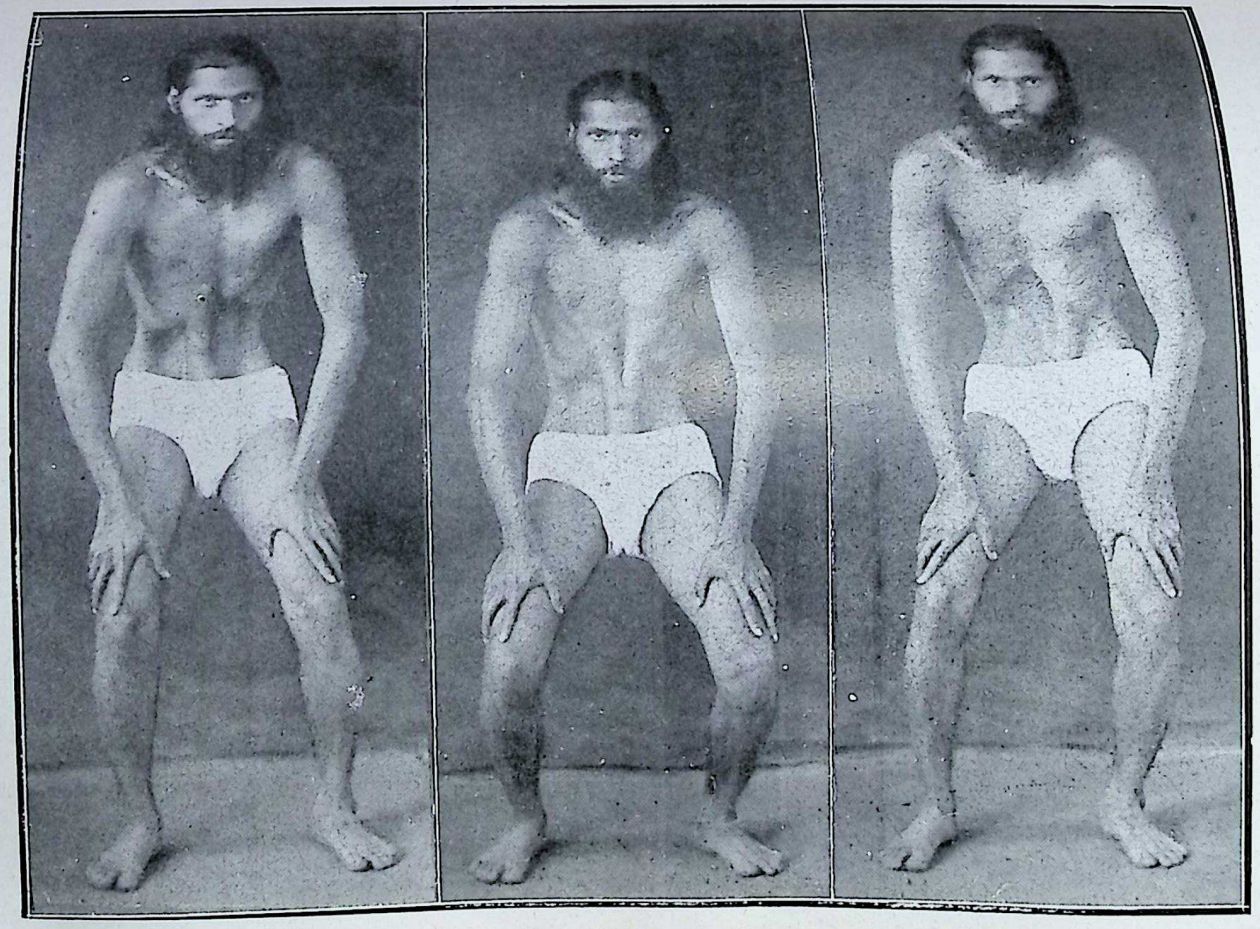
Fig. XXXVI *Fig. XXXVII* *Fig. XXXVIII*



Right Side Muscles Active. Right & Left Side Muscles Active. Left Side Muscles Active.

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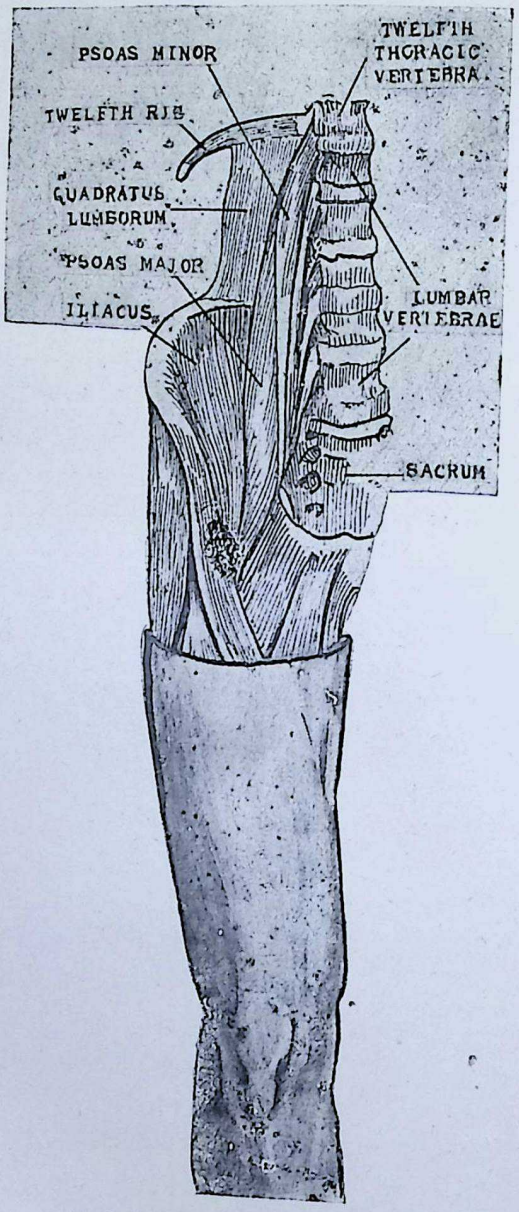
Fig. XXXIX



Back Muscles of the Abdomen.

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are similar in nature. We can observe the work of the obliquus externus even in our ordinary life. When the thorax and pelvis are fixed these oblique muscles compress the abdominal viscera; and thus assist in expelling the fæces from the rectum, the urine from the bladder and the fœtus from the uterus. If the pelvis alone is fixed, the trunk is bent forward when both the right and left muscles act, (Fig. XXXVII); if the muscles of one side act, the trunk is bent forwards that side and the front of the abdomen turned towards the opposite side. (Figs. XXXVI and XXXVIII). If the thorax be fixed, the muscles, acting together, draw the front of the pelvis upwards as in the act of climbing.

The rectus abdominis has already been referred to in describing the technique of Uḍḍiyāna and Nauli in the last number of this journal, (Vide pp. 9 and 25). It is a long flat muscle, broader above than below, which extends along the whole length of the front of the abdomen from ribs to pubic bones. The rectus acting from below depresses the thorax and in continued action bends the vertebral column. It is also a powerful compressor of the abdominal viscera.

The psoas major, psoas minor and iliacus arise from the front of the backbone in the lumbar region and from the hollow of the haunch-bone. They pass over the edge of the pelvic bones to the thigh-bone below and there become attached to it. (Vide Fig. XXXIX).

The function of these muscles is to bend the hip-joint. Now if the trunk be fixed and these muscles are contracted, they will fold the thigh upon the abdomen; whereas if a man takes a firm stand upon his legs and contracts these muscles, his trunk will bend forward.

The quadratus lumborum is irregularly quadrilateral in shape and broader below than above. It stretches from the hip-bone to the first rib. (Fig. XXXIX). By its contraction it helps the trunk to bend.

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THE PERITONEUM

These and other muscles together with other soft tissues make the inner surface of the abdominal cavity very smooth. The rough bones are covered up. In order to add to the smoothness, however, the whole cavity is lined with a delicate membrane called the *peritoneum* that acts like a sack for holding the abdominal viscera. The greater part of the digestive tube, the liver, pancreas, spleen, kidneys etc., all lie within this soft membrane.[1] It must not be supposed, however, that these organs are piled up there in a loose heap. They are kept to their respective places by the peritoneum. Though this membrane stretches itself along the abdominal wall, it often leaves this wall and forms itself into folds which either cover the inner organs or are attached to them. For instance, the peritoneum covers the liver in its folds, whereas it is only attached to the small intestine. Its connections with the bowels are called the *mesenteries* and those with the colon the *mesocolon*. The mesenteries are the mesentery (mesentery proper), the mesenteriole of the appendix, the transverse mesocolon, and the sigmoid mesocolon.

The mesentery is a broad fan-shaped fold of peritoneum connecting particular parts of the small intestine with the posterior wall of the abdomen.

The mesenteriole is a triangular fold of peritoneum which clothes the appendix and is attached to the lower end of the mesentery.

The transverse mesocolon is a broad fold connecting the transverse colon to the posterior wall of the abdomen.

The sigmoid mesocolon is a fold of peritoneum which attaches the sigmoid colon to the lower abdomen.

The mesenteries supply a channel for the blood-vessels and lymphatics to pass to and from the colon.

1 Vide Figs. XL, XLI and XLII.

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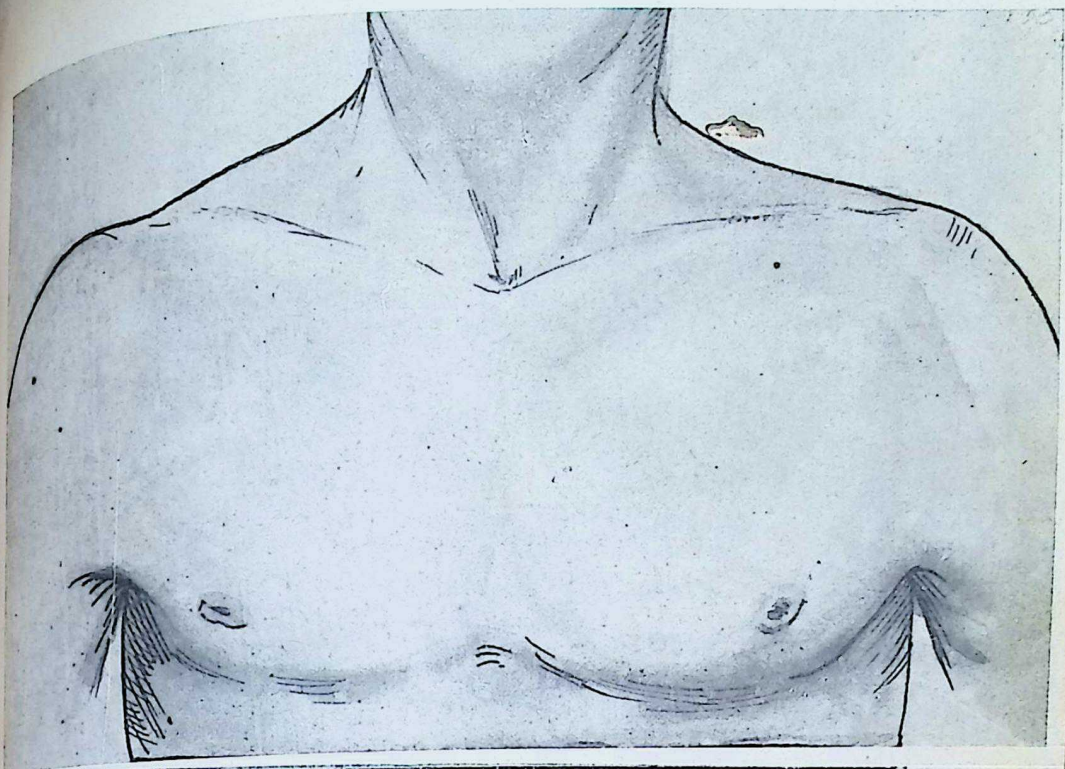
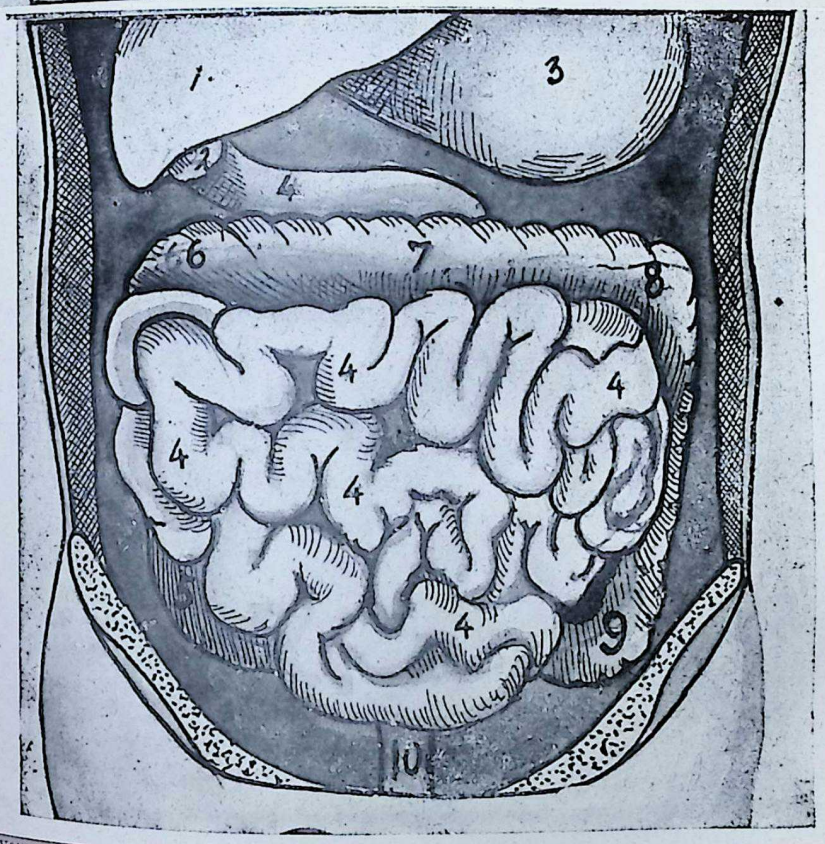
Figs. XL, XLI, XLII.





1 The Liver. 2 The Gall-Bladder. 3 The Stomach. 4 The Small Intestine. 5 The Cecum. 6 The Hepatic Flexure. 7 The Transverse Colon. 8 The Splenic Flexure. 9 The Sigmoid. 10 The Rectum. 11 The Pancreas. 12 The Spleen. 13 The Kidneys. 14 Ureters. 15 The Bladder.

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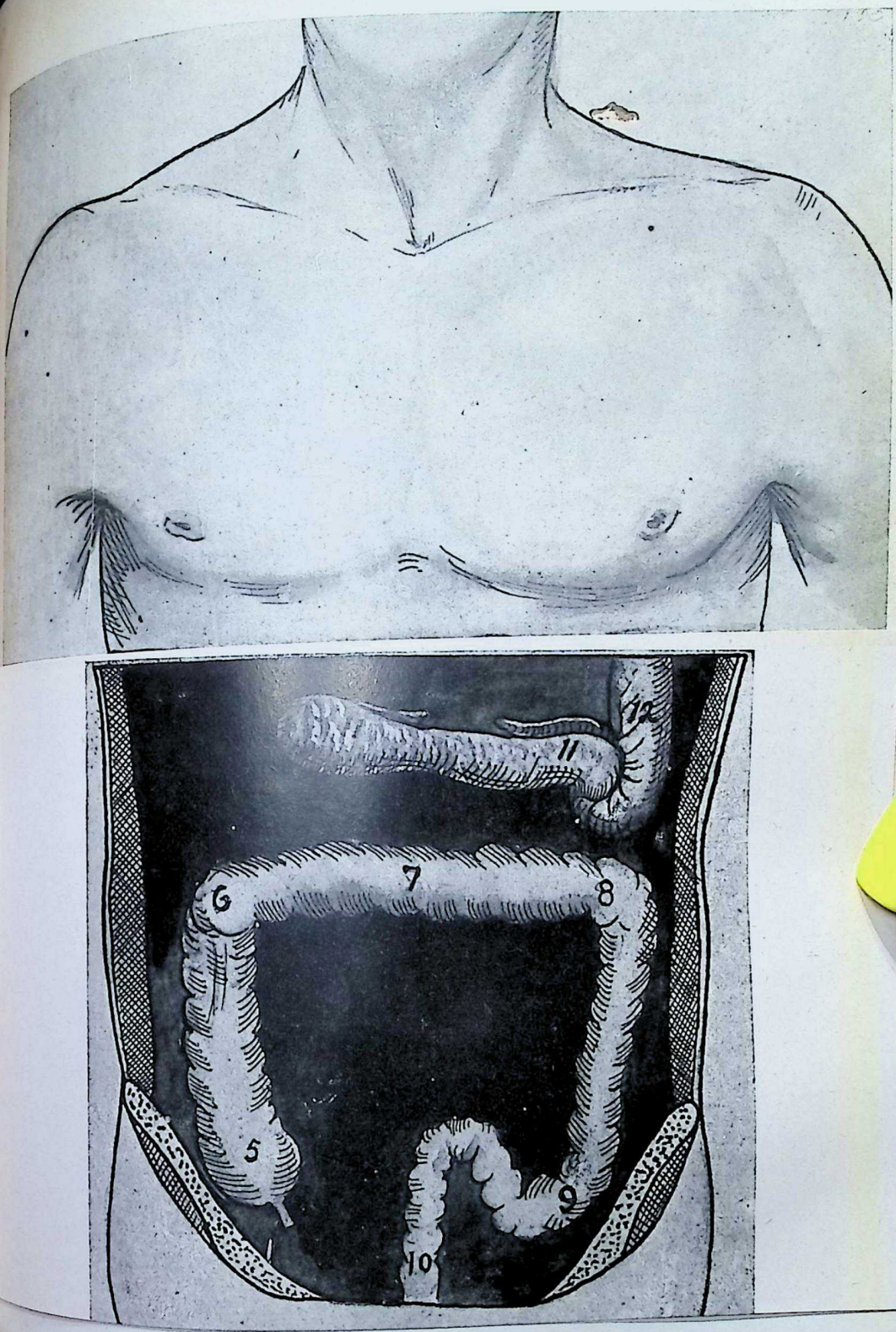
Figs. XL, XLI, XLII.



Abdominal Viscera.

1 The Liver. 2 The Gall-Bladder. 3 The Stomach. 4 The Small Intestine. 5 The Cecum. 6 The Hepatic Flexure. 7 The Transverse Colon. 8 The Splenic Flexure. 9 The Sigmoid. 10 The Rectum. 11 The Pancreas. 12 The Spleen. 13 The Kidneys. 14 Ureters. 15 The Bladder.

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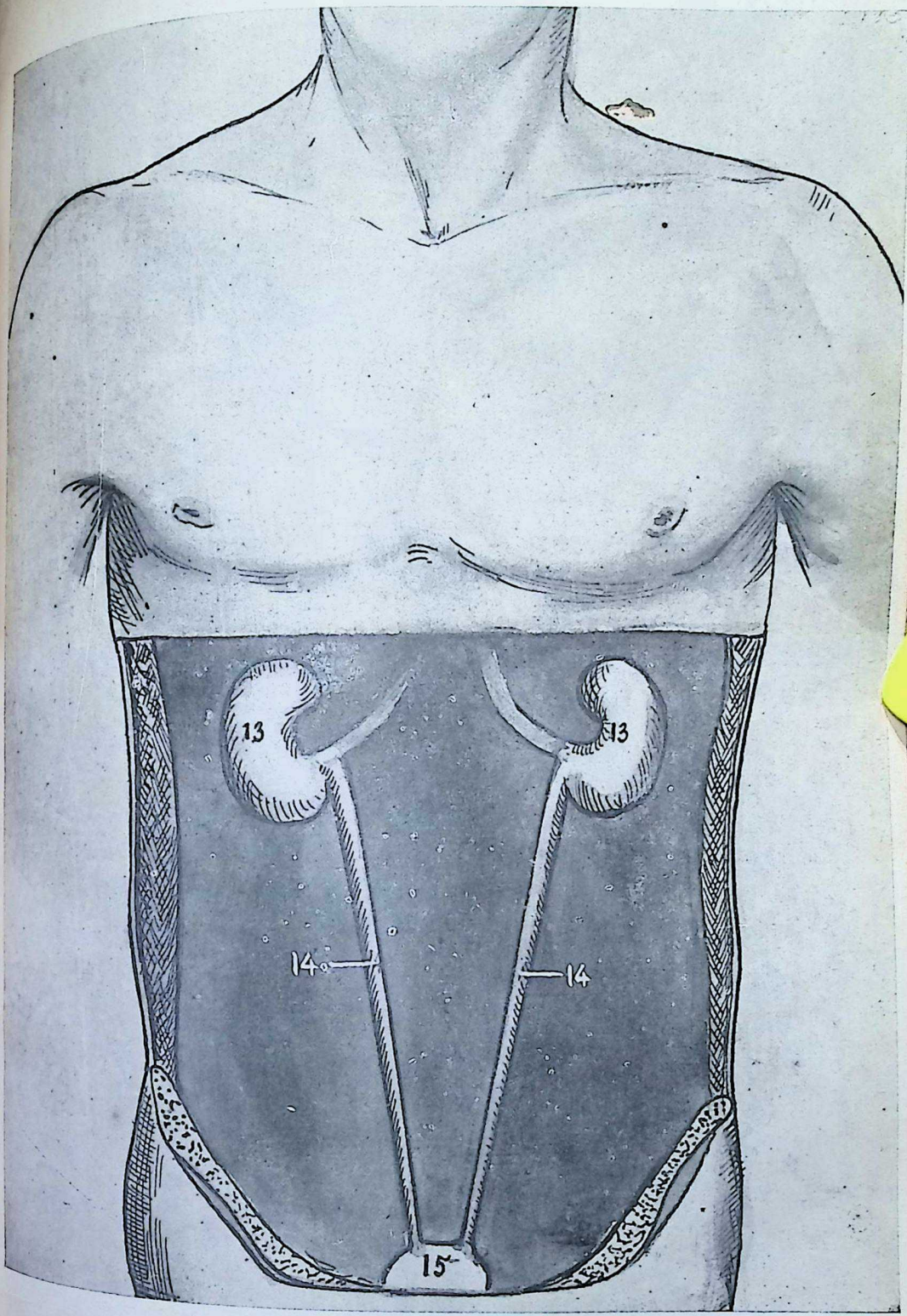

Abdominal Viscera.

1 The Liver. 2 The Gall-Bladder. 3 The Stomach. 4 The Small Intestine. 5 The Cecum. 6 The Hepatic Flexure. 7 The Transverse Colon. 8 The Splenic Flexure. 9 The Sigmoid. 10 The Rectum. 11 The Pancreas. 12 The Spleen. 13 The Kidneys. 14 Ureters. 15 The Bladder.

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The free surface of the peritoneum is smooth and is also lubricated by a small quantity of serous fluid. Hence the viscera can glide on the wall of the cavity or on one another with the least possible amount of friction.

NOTE—Figs. XL, XLI and XLII will give a correct idea regarding the relative positions of the different viscera in the abdominal cavity.

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CECAL CONSTIPATION

PART II

In the first part of this article we have taken a short survey of the remedies devised by the modern world against cecal constipation. After a brief statement of the theory of auto-intoxication, a reference was made to the operative cure. This was followed by remarks on the use of purgatives and laxatives, and on the advantages of the enema, with a mention of the J. B. L. Cascade, muscular exercises and mechanical treatments. In this part we propose to discuss, at some length, the Yogic cures of cecal constipation; and to institute a comparison between these ancient methods and those of the modern world.

But before we proceed to discuss the Yogic cures, we wish to say a few words again about auto-intoxication, with a view to make our position quite intelligible to our readers.

The statement made in the first part of this article is based on the researches of the eminent French physician, Bouchard, to whom we owe the word auto-intoxication. Matchnikoff, Tissier, Combe, Lane of London and a number of expert medical men all over the world have enthusiastically advocated the same theory; and have recognized the far-reaching destructive effects of the absorption of bacterial poisons from the intestinal tract.

Professor Adami and others, however, hold a different view. They maintain that there is little evidence to show that large quantities of toxins are produced *in the intestines* owing to the bacterial action upon the food-stuffs. They do admit the possibility of production of toxins *within the body*; but they attribute this production to a condition which Professor Adami names "sub-infection". By this is understood the liberation of toxins within the *body cells* by the destruction of bacteria which have passed through the walls of the intestine into the tissue cells. According to the first theory toxins are formed in the intestines;

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whereas according to the second, they are formed, not in the intestines, but in the tissues outside the intestines.

Now whichever theory may be correct, it is admitted by the advocates of both that chronic constipation leads to the poisoning of the different parts of the body with toxins produced within the body itself.

But there is another important point regarding the theory of auto-intoxication as it is propounded by Bouchard and others, which requires some explanation. The close relation between a number of dangerous diseases and auto-intoxication advocated by these savants, was at first violently opposed by many eminent medical authorities. Even to-day the voice of opposition is not altogether silenced; but now there are few up-to-date medical men who do not recognize the close relation between chronic constipation and a long list of chronic disorders. Even these few, however, though they do not openly acknowledge the correctness of Bouchard's doctrine, in their practice acknowledge his principles. To take an illustration : they will not admit the etiological relation between constipation and *arteriosclerosis*—a disease that hardens the walls of arteries and increases blood-pressure—but they will start their treatment of the latter by treating the colon of the patient. Paraffin oil and seidlitz powders will be administered and not nitrites that directly lower blood-pressure.

Thus it will be readily seen that there is a fair agreement among scientists regarding the dangerous character of constipation and its importance from the therapeutical point of view. A discussion on auto-intoxication is introduced in this article, not for studying the comparative merits of the different views obtaining about it, but for clearly pointing out the important position constipation occupies in the field of pathology and therapeuties. What applies to constipation in general holds good in the case of cecal constipation in particular, because the latter is only a grave aspect of the former.

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Another question which deserves our attention before the Yogic cures are studied, is the etiology of cecal constipation. Because when we know the causes of this condition, we shall be able to see how particular exercises in Yoga can remove these and thus cure the patient of his disorder.

Medical men appear to be unanimous in declaring that the modern civilization is responsible for the universal spread of constipation in the civilized countries. We would like to quote from P. Lockhart-Mummery who is on the whole a much impartial writer.

"Chronic constipation, like many other complaints of the present day, is in most cases a result of modern civilized life. Among native races and wild animals it is practically unknown, but is all too common in civilized communities, and, indeed, forms one of the most frequent disorders of our great cities. Modern methods of dietary and the sedentary character of our daily life are largely responsible for the tendency to constipation which is so prevalent. It is one of the penalties we pay for the comparatively small use we make of our colons." [1]

But this etiological statement is too vague to be of any advantage in understanding the immediate causes of constipation. These may be roughly stated to be two ;—

i The weakness of the abdominal muscles.

ii The degeneration or absence of the normal nervous and muscular control of the colon wall.

We shall take them up one by one.

A reference to the note on the anatomy of the abdomen on p. 109, will make it clear to the readers that the colon is situated in the abdominal cavity, its different parts being attached to the posterior abdominal wall by means of the mesocolon. Hence it seems to be often supposed that the colon is suspended in the abdominal cavity by this mesocolon. But really speaking the

1 *Diseases of the Rectum and Colon* (1923), p. 321.

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mesocolon is not a true suspensory ligament of the large intestine. The transverse colon often contains several pounds of matter; and if the mesocolon were made to support all these pounds, it will be very seriously stretched, for it is a weak structure, and all of us would be suffering from the displacement of the colon. The fact is that the colon is merely attached to the back wall through the mesocolon and does not throw much burden upon it. It is the muscles of the abdominal wall that mainly bear the burden of the intestines.

"In a normal individual the abdominal wall is a firm elastic structure which maintains a more or less constant pressure within the abdominal cavity. This pressure has been estimated to be as much in some persons as ten pounds to the square inch. It is probable that it is always in a normal person sufficient to more than counterbalance the effect of the action of gravity upon the abdominal viscera; and that under normal conditions the intestines may be said to float within the abdomen, so that no drag is exerted upon the mesenteries.

"If for any reason the abdominal wall becomes weakened this state ceases to exist, and all the abdominal contents are subject to the effects of gravity, and tend in consequence to become displaced downwards. We see evidence of this in cases where the intra-abdominal pressure is suddenly altered, as, for instance, in persons who suddenly lose a great deal of weight. The loss of fat within the abdominal cavity, where much of the normal fat is stored, results in a decrease of space, greater as a rule than the abdominal wall can compensate for; and we know as a fact that marked loosening of the organs commonly results in such cases. The stomach and colon are displaced downwards, and the kidneys and the liver become more or less loose. The same thing is not uncommonly seen in women after child-birth, when the abdominal wall has been badly stretched, and has been slow in recovering." [1]

[1] P. Lockhart-Mummery's *Diseases of the Rectum and Colon* (1923), pp. 327–28.

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The abdominal wall not only counteracts the effects of gravity on the intestines but it also stimulates the bowels to action. When, however, the abdominal muscles become relaxed and the intra-abdominal pressure is reduced, this stimulus becomes weak. The stomach and the intestines have a tendency to dilate. In health the food is grasped by the digestive tube as soon as it reaches the throat, and this grip is maintained until the residue of the food is expelled at the other end. But in disease when the intra-abdominal pressure is reduced, the stimulus has grown weaker and the digestive tube is dilated; bowel contents are not pushed forth and stagnation results. In course of time this becomes chronic and dangerous symptoms of auto-intoxication are visible, especially when the seat of constipation is the cecum.

Now it will be readily admitted that the type of constipation that is due to the degeneration of the abdominal muscles, can only be cured by the regeneration of these and not by any other measures. No amount of purgatives and laxatives can render these muscles healthy. The enema is altogether useless in this work. If the drugs and the enema affect anything it is the intestines and not the outward abdominal muscles. They are not only useless in improving the external wall, but they are positively harmful to the bowels. The drugs irritate and render them weaker, whereas the enema leads to a greater dilation of the colon. Muscular exercise is the only right remedy against this type of constipation and we are glad to see that even medical works on surgery are recommending these exercises. Now the exercises of Uḍḍiyāna and Nauli, as they are taught in Yoga, will be found to be of the highest efficacy in this regard. How, we shall try to prove in the following few lines.

Taking up the practice of Uḍḍiyāna we see that it exercises nearly every muscle of the abdomen. Our readers will find in the last issue some details of the muscular movements involved in the exercise; but here we propose to treat the subject at some length, so that even the popular mind can understand it clearly.

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As a measure against constipation, Uḍḍiyāna is best practised while standing and the following description will mainly refer to this variety of it.

As stated in the last issue of this journal (on p. 12), the student bends his knees a little and stoops a good deal while preparing himself for Uḍḍiyāna. This is done to secure full scope for the working of abdominal muscles. The practice starts with a complete exhalation. This empties the lungs which are consequently contracted, and allows the diaphragm to rise to a very high level. Then the two recti, the obliquus externus, obliquus internus, and the transversus are all vigorously contracted. This contraction presses these muscles under the ribs and gives a more pronounced forward bent to the trunk than is originally assumed. The psoas major, psoas minor and iliacus also contract in order to co-operate with the above mentioned muscles, and help the trunk to flex. After this a vomitting-like action is done. This consists in strongly contracting the side muscles, thereby vigorously compressing the abdominal viscera and giving them an upward push. The recti also contract further. But they are much relaxed after the upward and inward push is given; whereas the three side muscles stand contracted throughout the pratice, maintaining the new position of the viscera. The diaphragm which stood already very high, now rises higher and occupies the highest possible position in the thoracic cavity. The sudden upward movement of the diaphragm requires the contraction of not only the superficial but also of the deep muscles of the back. Especially the lumbar region to which the diaphragm is strongly attached is well stretched out. In fact the whole peritoneal wall is raised.

Though Uḍḍiyāna involves a vomitting-like action, it should, by no means, be supposed that the practice is unnatural. There is a fundamental difference between the two: vomitting and Uḍḍiyāna. Vomitting is always preceded by an inspiration whereas Uḍḍiyāna by an expiration. Thus in vomitting, on account of inspiration, the diaphragm is lowered down; and as the lungs stand all along expanded, it forms an unyielding

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roof of the abdominal cavity. The contracting muscles of the abdomen press the stomach against this stiff diaphragm and force out its contents with the help of anti-peristalsis. But in Uḍḍiyāna the empty lungs allow the diaphragm to rise to its highest level in the thoracic cavity; and the stomach, though pushed up by abdominal muscles, finds ample accommodation in the abdomen. Again vomitting becomes possible only when the stomach is full, but the exercise of Uḍḍiyāna is to be done invariably when the stomach is empty. Thus it will be clearly seen that there is nothing unnatural in Uḍḍiyāna, although it may have some movements in common with vomitting.

Uḍḍiyāna is maintained till the student can conveniently hold his breath out. It is ended by relaxing the abdominal muscles which allow the diaphragm to descend, the lungs to expand, and the breath to flow in.

Though Uḍḍiyāna is a very good exercise for abdominal muscles, Nauli is still better. The reader will find a few lines bearing on the technique of this practice on p. 25, in the last number of this journal. Coming to details we see that Nauli is only a further development of Uḍḍiyāna. The latter in its perfect stage requires the recti to be comparatively relaxed, though on the two sides of these, the two oblique muscles and the transversus stand vigorously contracted. In Nauli, the contracted character of the side muscles is to be maintained; but the recti are to be isolated from them and with the most perfect contraction to be pushed forth. This is accomplished by a downward push of the anterior part of the diaphragm helped in its action by the superficial and deep muscles of the back. When the isolation is complete the abdomen wears the appearance shown in Fig. XXXVII.

One point which deserves special attention here, is the contraction of the thoracic muscles which must accompany the abdominal work in Nauli. Under their action the capacity of the thorax is reduced and the lungs are made to press upon the diaphragm which contracts under their pressure.

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But the exercise of Nauli does not end here. Nay, the remaining manipulations of the abdominal muscles are even of greater importance. These consist in making a wave of the muscular contraction pass across the abdomen from the left to the right and from the right to the left. This wave of contraction is followed by a wave of relaxation, the two together giving the abdomen the appearance of an undulatory surface of water. The starting point is the two recti. Throughout the rolling manipulations, one of the recti is maintained stiff, whereas the other is relaxed. Let us start with the left rectus abdominis. While this is kept fully contracted, the muscles of the right half, the right rectus abdominis and the three side muscles, are relaxed and lie flat upon the belly. The three side muscles of the left are kept stiff along with the rectus. Now the left rectus is rolled to the extreme left by making the contraction of the left side muscles more vigorous and the relaxation of the right muscles more complete. When the rectus reaches the extreme left, it itself and the other muscles on its sides are suddenly relaxed; and the right rectus is made to stand fully contracted on the extreme right border of the abdomen. Of course the side muscles of the right also are stiffened; and it looks, as it were, that the muscular wave had, in a moment, transferred itself from the left to the right. The right side muscles are then relaxed and the right rectus made to travel to the middle of the abdomen. Then it itself is relaxed, transferring its contraction to the left rectus which again continues to be rolled to the extreme left, a wave of relaxation following it.

Upto now we have taken into account only those muscles that lie in front and at the sides of the abdomen. Let us now consider those that stand behind the abdominal cavity. The action of the psoas major, psoas minor, and quadratus lumborum deserves notice. As the practice of Nauli requires the trunk to be a little flexed upon the thighs, these muscles remain contracted throughout the exercise. But the vigour of contraction differs in different positions. For instance, when the rectus stands rolled off to the extreme left, the action of these back

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muscles is the strongest on that side, but the weakest on the right. The result is that the trunk is more bent on the left than on the right, and the front of the abdomen is turned towards the latter side. (Fig. XXXVIII). As the rectus is being rolled to the middle, these back muscles begin to relax; and by the time the rectus reaches the extreme right, the back muscles on the left side become weak in their action, whereas those on the right stand powerfully contracted. Then the trunk is flexed more on the right than on the left side and the front of the abdomen turns to the left. (Fig. XXXVI). Thus it will be seen that even the back muscles experience a wave of contraction corresponding to the wave passing over the front and side muscles of the abdomen.

The same is the case with the diaphragm. It has already been noticed that during the practice of Nauli the diaphragm stands contracted above the abdominal viscera. Now the isolation of abdominal muscles is possible only with the help of the diaphragm. So in order that a wave of isolated muscles may be made to cross the abdomen, it is necessary for the diaphragm to be thrown into a similar wave of contraction.

Thus it will be seen that every important muscle that goes to form the abdominal cavity is alternately contracted and relaxed during the exercise of Nauli. The action of muscles is shared by every fibre that goes to form them. Hence every fibre of the abdominal wall shortens and thickens, as the wave of contraction passes across it, and subsequently returns to its normal condition as relaxation follows.

There are many abdominal exercises devised by the physical culturists of the East and the West; but none can approach Nauli in its efficacy. No other exercise involves all the abdominal muscles and at the same time requires such vigorous contractions. A system of muscles moving as a whole has a decided advantage over individual muscles moving singly. In Nauli the whole muscular mechanism of the abdomen is made to move simulta-

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neously; and this places Nauli at the top of all the abdominal exercises, as the rest require only a part of the abdominal wall to work.

The following points also are in favour of Nauli.

The efficacy of a muscular exercise mainly depends upon the blood supply it induces to the parts exercised. The volume of blood diverted by a particular exercise, will undoubtedly vary chiefly as the vigour with which it would contract the muscles concerned. But it also varies as the degree of attention that is paid to the working muscles. According to the laws of physiology, blood gathers in every part of the body that is attended to, as shown by all Plethysmograph[1] experiments. It is to take advantage of this physiological law that physical culturists all over the world advise their students to concentrate their attention upon the working muscles. Now of all the abdominal exercises Nauli requires the greatest concentration, because it involves the co-ordination of the largest number of muscles; and necessitates not only that many muscles should take part, but that they must do so in their proper order and in due relation to the action of the remaining muscles. Thus Nauli being the most complicated exercise demands greatest attention and induces largest blood flow to the working parts.

Another point which adds to the excellence of Nauli is its capacity to build a powerful spinal column, especially in the lower thoracic and lumbar regions; and also to tone up the spinal nerves that supply abdominal muscles.

It is admitted on all hands that stretching exercises develop the vertebral column in the most efficient way. The reason is this. These exercises are best calculated to work the muscles which hold the backbone in its place and to promote blood circulation roundabout it. Now the vertebræ also are supplied with blood-vessels; and when a richer flow of blood is diverted to their side, they get better nourishment, and consequently

1 Plethysmograph is an instrument for recording alterations of the volume of blood in different organs of the body.

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grow stronger and healthier. Various appliances for stretching exercises have been constructed by physical culturists and are largely sold in the market. Uḍḍiyāna which forms a part of Nauli, however, constitutes a very good stretching exercise requiring no outside help. A reference to Radiographs I and II in the last issue, will show that Uḍḍiyāna stretches the first four lumbar vertebræ over 5.5"; when in their normal position they occupy only 5.25". This shows a clear stretch of 5 per cent. in the lumbar region. Though we cannot give to-day any radiographic evidence for the lower thoracic vertebræ, we are sure they experience a similar stretch owing to the upward pull given by the diaphragm during Uḍḍiyāna. Again the effect of this pull is increased by the downward push given to the lumbar vertebræ during Nauli proper. The height of the lumbar vertebral column in Uḍḍiyāna, is reduced, in Nauli, by an inch in a foot. [See 10—(d), p. 94]. Thus the two practices Uḍḍiyāna and Nauli, the latter including the former, constitute an excellent stretching exercise, and build a strong lumbar region supporting the abdomen.

Coming to the spinal nerves, we find from the chart given on p. 126, that important abdominal muscles are supplied by spinal nerves arising from the lower thoracic and lumbar regions. Now as Nauli enriches the blood supply of these parts, these nerves are well fed at their very roots and consequently improve in their tone. Thus Nauli not only exercises the abdominal muscles but it also keeps their nerve supply in a healthy condition.

From the arguments put forth in the foregoing paragraphs it will be clear to everyone that Nauli is very effective in building up a powerful abdominal wall, taking care of muscles, bones, nerves and everything. It has, therefore, great efficacy in preventing and curing constipation, arising from the weakness of the abdominal muscles.

These exercises of Uḍḍiyāna and Nauli may be supplemented by the practice of the poses described in the Popular Section of this issue. For persons too weak to start with Uḍḍiyāna and

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Nauli, these postures will be of great use to make a beginning. Though these Āsanas cannot compare favourably with Nauli, they are as good as any other curative exercises against constipation.

Thus we see that the weakness of the abdominal muscles, the first of the two causes of constipation mentioned on p. 116, is best removed by Yogic exercises. Next we want to see how far these exercises can help a patient to get rid of the second cause.

(To be continued.)

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A TABLE OF ABDOMINAL MUSCLES AND NERVES SUPPLYING THEM

MUSCLES	NERVES
Diaphragm	Lower six or seven intercostal nerves.
Obliquus externus ...	Anterior divisions of the lower thoracic nerves.
Obliquus internus ...	Anterior divisions of the lower thoracic nerves and the first lumbar nerve.
Transversus abdominis ...	Lower thoracic and first lumbar nerves.
Rectus abdominis ...	Anterior divisions of the lower thoracic nerves.
Psoas major	Branches from the second and third lumbar nerves.
Psoas minor	Branches from the first lumbar nerve.
Iliacus	Branches of the second and third lumbar nerves.
Quadratus lumborum ...	Anterior divisions of the twelfth thoracic and upper three or four lumbar nerves.

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The Popular Section

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N. B.:—The Director of the Kaivalyadhāma entreats every man of means to show his active sympathy for the Āś'rama.

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पुस्तकालय
गुरुकुल काँगड़ी

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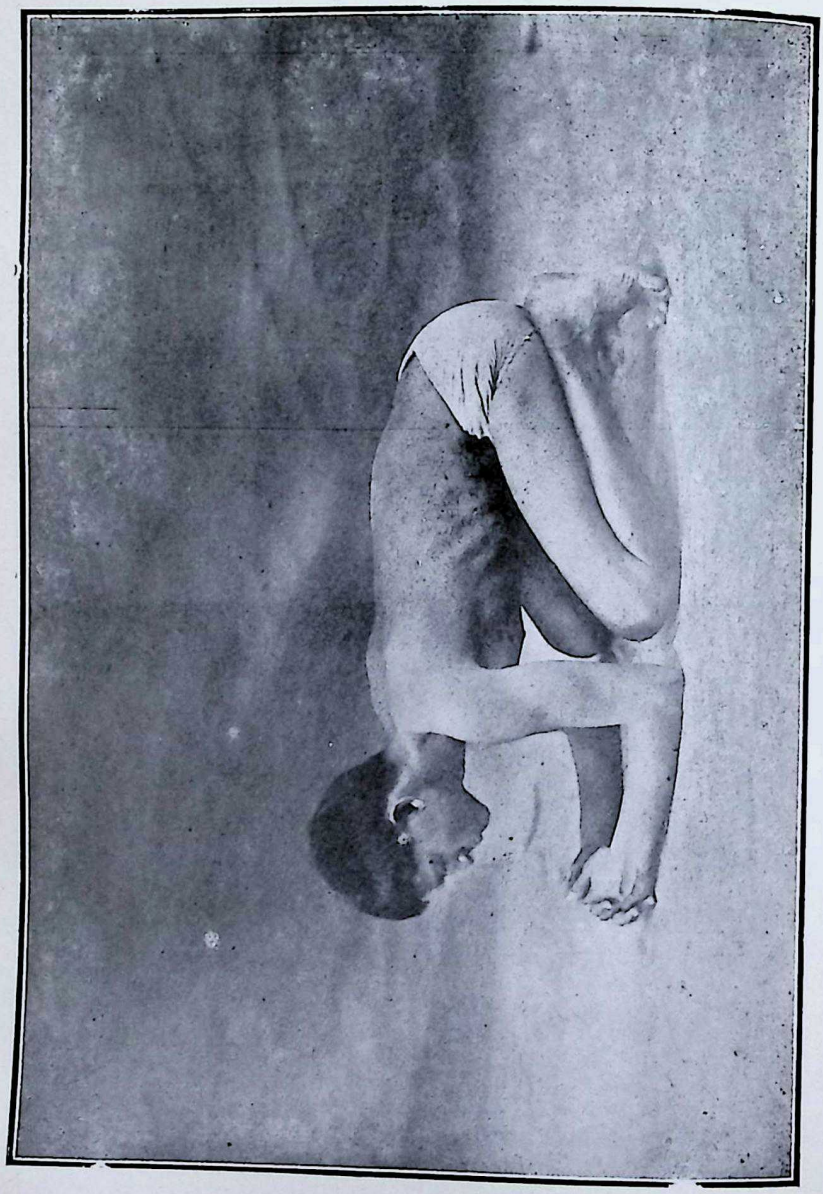

Fig. XLIII

Preparation for Śīrshāsana.

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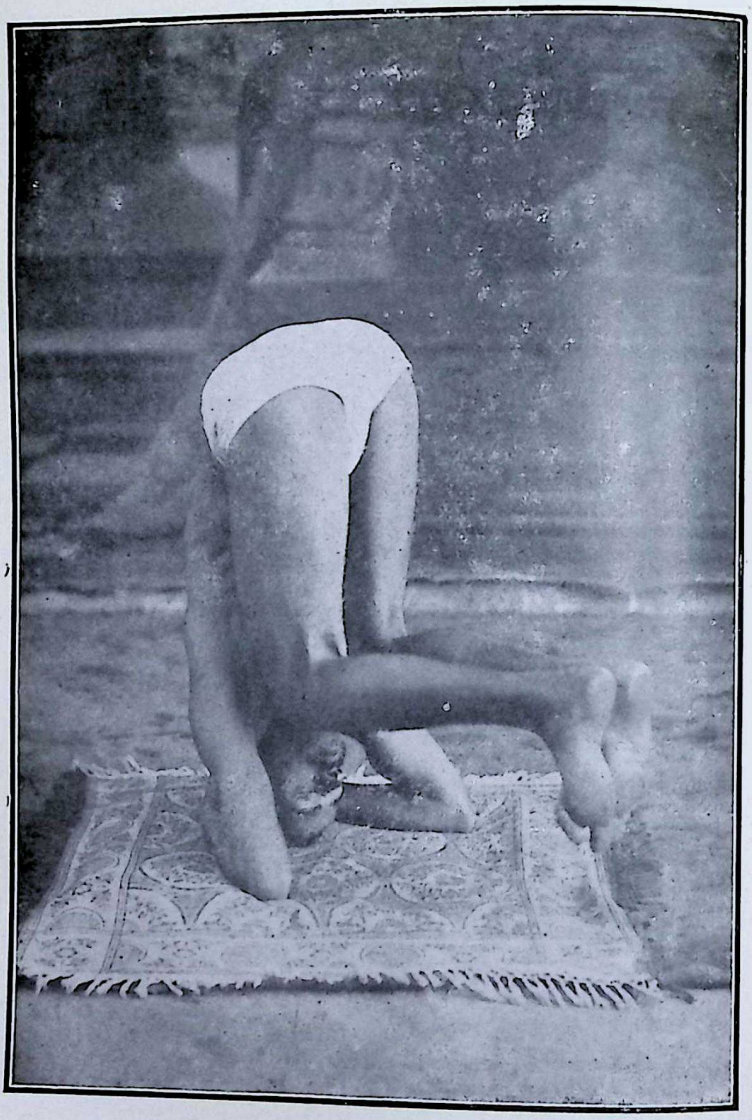
Fig, XLIV



Sīrshāsana or The Topsyturvy Pose.
(Starting balance)

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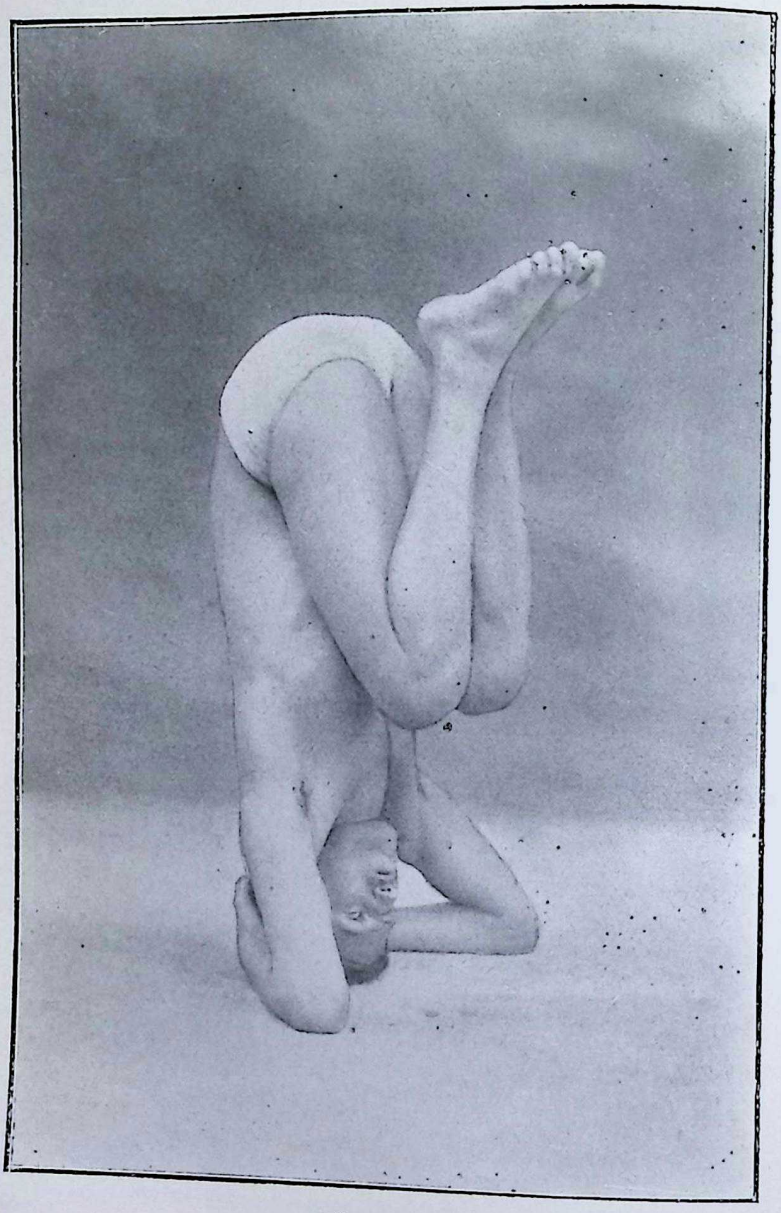
Fig. XLV



S'irshāsana
with
Thighs Folded.

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Fig. XLVI

Śīrshāsana
with
Thighs Extended.

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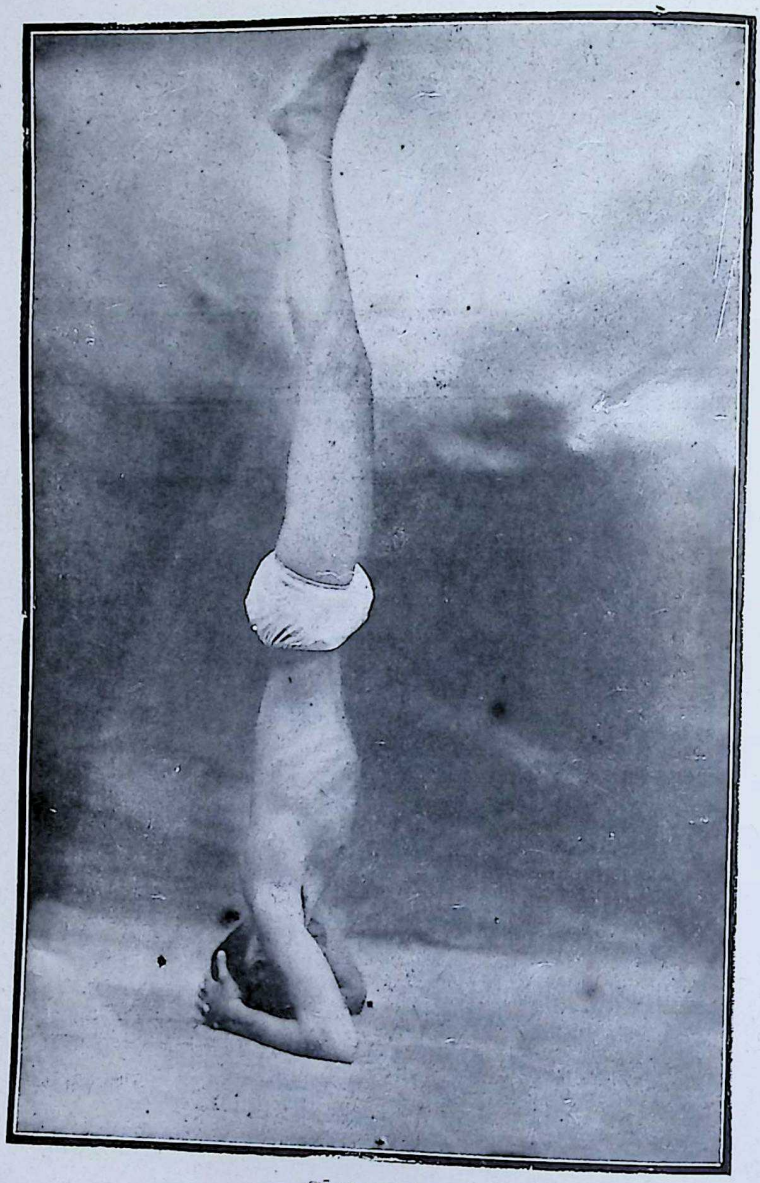
Fig. XLVII



Sīrshāsana.
(Full pose)

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S'ĪRSHĀSANA [1]

or

THE TOPSYTURVY POSE

THE NAME :—

This pose is called S'īrshāsana because it requires the student to stand on the head. S'īrsha means the head.

THE TECHNIQUE :—

Some details of the technique have already been noticed on p. 14, in the last issue of this journal. As stated therein the student first prepares his finger-lock and places it in his front, making a convenient angle with his forearms, the finger-lock serving as the vertex. (Fig. XLIII). Then he places his head at the vertex. For this purpose the hinder part of the top of the head is to be used and not the part nearer the forehead. The reason is that during the balanced condition, as illustrated in Figs. XLIV to XLVII, the spine must stand as erect as possible. If the front part is employed the spine would suffer a curve in the cervical region. All this time the student is either squatting on his seat, or kneeling on it as shown in Fig. XLIII. After this he slowly raises his trunk lifting up the lower end of it, and tries to hold

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1 Under this Section, our readers might have expected to find the second part of our article on the Pan-Physical Pose published in the last issue. We regret, however, that a further discussion of that pose had to be postponed as we had to make room for the postures described here. A discussion on Nauli, especially in its bearing on constipation, required a reference to these poses. We have not entered into details regarding these exercises, however. Only such hints as are absolutely necessary for starting their practice, are given here. But even this short treatment has exhausted the space at our command. Hence the second part of the article on the Pan-Physical Pose had to be reserved for the next number.

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it perpendicular with the ground. For this purpose he puts the weight of his trunk on three points: the two elbows and the head supported by the finger-lock. He gradually raises his knees and brings his toes nearer to his elbows. When the trunk supported on the head is sufficiently thrown backward, the student finds that he could lift his toes from the ground without standing in danger of a collapse. (Fig. XLIV). All these movements he accomplishes very smoothly, and does not give any jerks to his body, for they are likely to upset the balance rather than establish it. He then draws his knees to his chest, folds his legs, straightens his back, and tries to be firm in his balance in this position. (Fig. XLV). The practice of this first stage of S'īrshāsana is continued over some days, so that the muscles get used to it and their work becomes easy.

When the student can do this first part of the Āsana with ease and grace, his remaining task is very simple. In the second stage, he is simply to straighten out his thighs and bring them in a line with the trunk. (Fig. XLVI). Here the balance is never allowed to go to the back side. The whole work is smoothly accomplished by the contracting muscles of the back and buttocks. The third and the last stage is reached when the legs are opened out; and the whole frame stands at right angles with the ground. (Fig. XLVII).

Just as ordinarily we do not feel the slightest burden on any part of the body, while we are standing on the legs; so by practice, the student, in this pose, does not experience any burden, as the whole body stands perfectly balanced, and the weight is evenly distributed over its different parts.

The balance required for S'īrshāsana is best secured by the methods indicated in the last three paragraphs. People look to be under the impression that they could start their practice of this pose by throwing up their

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legs, if they could get somebody to hold them up in the air; or failing the services of an intelligent living being, even if they could get a dead wall for support. The legs are tossed with violent jerks, and these hasty people often find themselves playing the part of a tumbler only minus his acrobatic skill! Even if they fare better, the psychological need of a support is always felt; and these people continue to feel insecure in this posture, even after months of daily practice. But if they try to go without any outside help from the very beginning, they obtain the necessary skill in a few days.

Great care must be taken about the period to be devoted to this practice. The best way is to start with 15 seconds and to increase the time very cautiously. Every symptom should be watched and the least possibility of overdoing one's part be avoided. If proper precautions are taken, there is absolutely nothing in this pose which might lead to trouble. The maximum period should be 24 minutes. We have seen, however, a number of people practising this Āsana for more than half an hour every day, and thereby maintaining very sound health. Some of these are past fifty, and in their communications addressed to us, bear eloquent testimony to the manifold advantages, a regular practice of this pose can give. Some of these benefits will be found discussed in the article on cecal constipation in this and the next issues; but a full discussion of the effects of this exercise must be reserved for an independent article. They are too numerous and important to be noticed casually.

The variety of Uḍḍiyāna described on p. 14 and illustrated in Fig. VI, in the last number, however, may be taken here into consideration. It can be developed from the first stage of this Āsana as illustrated in Fig. XLV. Along with an attempt at Uḍḍiyāna, in order to force open the rectum, some work is required to be done with the levator ani and the anal sphincters.

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With every exhalation these muscles are to be contracted and with every inhalation they are to be relaxed. This alternate contraction and relaxation of these parts is technically called As'vinī-Mudrā in Yoga, because it imitates the anal action of a mare after she has excreted the bowel contents. In a few days control upon the parts exercised is obtained; and the sphincters can be so relaxed, that the gases shut up in the colon rush out when the abdomen is pressed in for Uḍḍiyāna. When the abdominal muscles are relaxed after Uḍḍyāna, fresh air rushes into the colon. Thus the colon, or at least the lower part of it, can be flushed with pure air, and a sense of lightness and relief can be fully secured through this As'vinī-Mudrā. Afterwards the sphincters may be closed at will.

POINTS OF STUDY :—

(a) *Blood-vessels* :—

The arch. of the aorta, the common carotids, the innominate and the subclavians are all inverted and send a richer blood supply to the brain. Regarding veins, nearly the whole column of venous blood that ordinarily has to rise against the force of gravity, has now gravity in its favour. Consequently the veins are relieved of much of their work, and their valves get ample rest in this pose.

(b) *Vertebrae* :—

The vertebral column stands upside-down. Hence the different vertebræ are now inversely burdened. Normally the lowest of the lot has to bear the greatest burden, whereas the highest the least. But in this pose the highest has to support nearly the whole body, whereas the lowest bears only the lower extremities. Thus the burden put upon the different vertebræ being

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inverted, the consequent pressure and stimulus given to any two vertebræ also stands in the inverse proportion.

[The skull that ordinarily has no pressure stimulus given to it in the body, gets the highest of it in this practice.]

(c) *Nerves* :—

As has been noted on p. 52 in the last issue, the 12 pairs of cranial nerves start from the brain, come out through the base of the skull, and are distributed to the different parts of the body. This pose, by diverting a richer blood supply to the brain, tones up these cranial nerves. The spinal cord, 31 pairs of spinal nerves and the sympathetic are directly or indirectly connected with the brain; and get their due share in the advantages of this Āsana.

This exercise opens another way, however, of approaching the sympathetic. The nerve supply of the rectum and anus is mainly from the sympathetic; and the nerve endings in the skin at the anal orifice are exceedingly numerous. The work of As'vinī-Mudrā principally lies with this part and through it the sympathetic is probably stimulated.

NOTE—

Ever since we published our articles on S'īrshāsana in the Kesarī, a vernacular weekly that claims the widest circulation in India, a number of persons have taken to the practice of this Āsana. Even before we drew people's attention to the importance of this pose, their partiality to it was great. No student of Yoga that worked for the control and purification of his body could neglect it. Even amateurs took peculiar pleasure in standing on the head and feel refreshed in brain and body. The impression is that anybody and everybody could do this exercise, there being practically nothing that would disqualify a candidate. The impression is quite right so far as people

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of normal health are concerned. But there are some serious limitations which cannot be overlooked with impunity.

People often suffer from *earache* or *running ears*. Not only during the attack, but also just before and after it, the malady is sure to be aggravated by the practice of S'īrshāsana. Generally the ailment is accompanied by inflammation in some part of the ear; and pressure exerted on the inflamed parts by this pose makes matters worse. A few remarks, on the anatomy of the ear and the physiology of this pose will make these points clear.

Everybody knows the outer ear and the passage that leads inwards from it. (Fig. XLVIII). This passage is an inch and a quarter long. At the other end of this passage is the *drum* or *tympanum* consisting of a membrane that stretches across and completely closes it. On the inner side of this drum, placed in one of the bones of the head, is a chamber known as the cavity of the middle ear or tympanic cavity. In this chamber there is an opening leading to a tube that passes into the back part of the throat after a course of about an inch and a half. It is known as *Eustachian* or *auditory tube*.

The external passage has open communication with the atmosphere outside. But the tympanic cavity can communicate with the atmosphere only through the auditory tubes. These are, however, ordinarily closed, and shut up within them some air which counterbalances the atmospheric pressure upon the external surface of the drum. Now if an additional amount of air be forced into these tubes, the internal pressure becomes greater than the external; and we feel, as if, the drum is bulging out. This often happens at the time of sneezing. Violent expiration forces open these tubes and drives some extra air into them. The phenomenon may be produced at will. These tubes open during the act of swallowing. Now every act of swallowing compresses the air in the throat. But we do not feel any pressure in the ear during such acts, simply because our nostrils are open, and allow the compressed air in the

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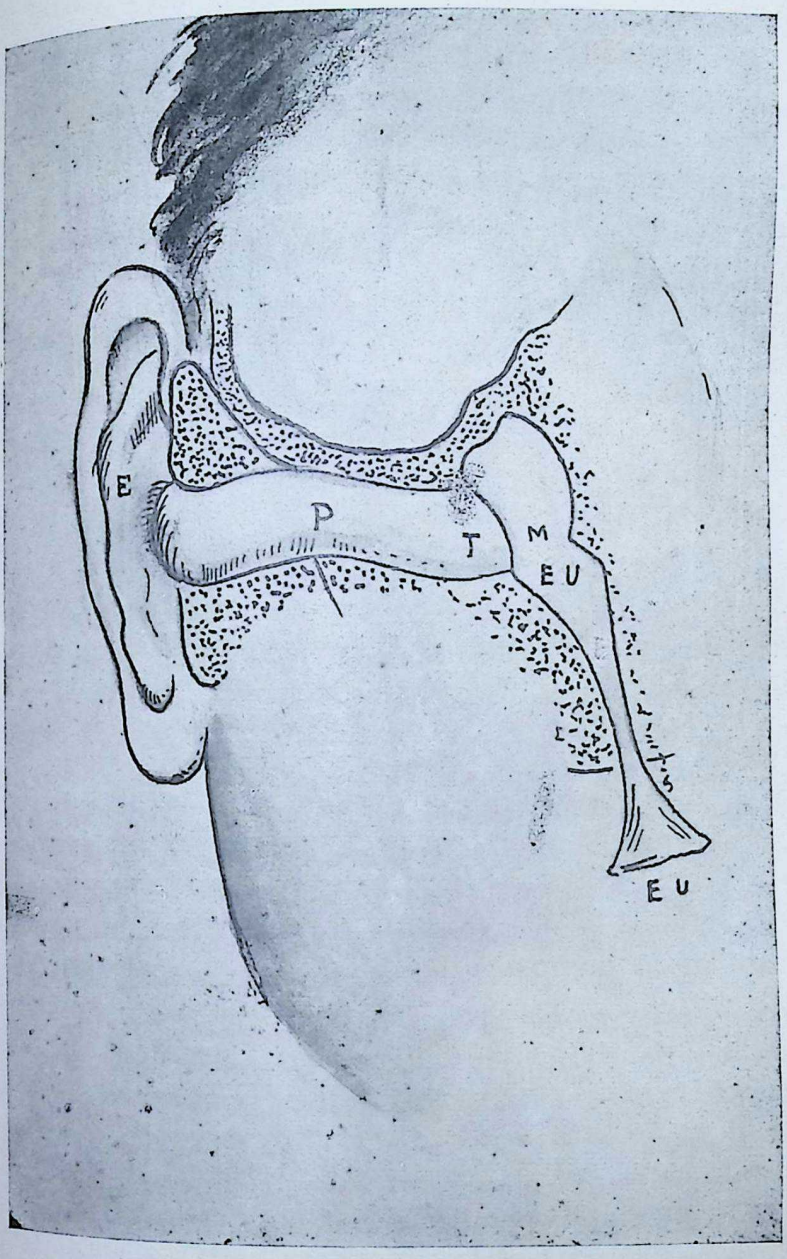
Fig. XLVIII



The Ear.

E – The External Ear.
P – The Passage.
T – The Tympanum or Drum.
M – The Middle Ear.
EU – The Eustachian or Auditory Tube.

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throat to escape rather than be driven into the auditory tubes. But if the nostrils are held tight and the act of swallowing is done, the compressed air will directly find its way up the auditory tubes which are now open and will put a pressure upon the tympanum. This pressure can be relieved by another similar act, only keeping the nostrils open. The tubes will open and get rid of the extra air, sending it out through the nasal passage.

Again this cavity is thinly separated from the blood-vessels that either pass by it or directly supply it. Any pressure put upon these vessels similarly affects this cavity also.

Now S'īrshāsana requires much muscular effort especially in the beginning and causes heavy breathing. If in this effort the auditory tubes are opened by an attempt at swallowing the salivary contents of the mouth, air is forced into the cavity of the ear; and puts considerable pressure upon the drum and the other parts of the internal chamber. It has been noted above that the blood-vessels are all inverted in this pose; and the blood-pressure in the head is, consequently, very high. The ear has also to bear a fair share of this burden.

Under these circumstances, if the ears are already running, or are otherwise inflamed or diseased, this additional pressure of the pose, instead of helping the situation, only makes it worse. Many people seem to labour under the impression that S'īrshāsana is capable of curing each and every ailment of the organs situated in the head. This impression is due to an obvious lack of physiological knowledge. But ignorance of physiological laws is no excuse. We have heard complaints from different persons that S'īrshāsana has spoiled their ears. The fact is that the ears were already bad and that the improper application of the Yogic remedy only made them worse!

There is another limitation. Some people have peculiarly weak eye capillaries. The bulb of the eye or the eyeball is

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composed of three tunics arranged behind one another, the middle one being called the *vascular tunic*. It is so named because it contains a multitude of small arteries and veins whose connecting capillaries form a very close network. During S'īrshāsana increased blood-pressure injures these capillaries, especially if they happen to be weak. Eyes are reddened with blood, and if people persist in their practice, in spite of these warnings of nature, serious troubles follow. Such persons should first strengthen their vascular tunic by simpler exercises in stooping, and then cautiously take to the Topsyturvy Pose. Even persons with stout visual apparatus would do well to make a very small beginning; and develop their practice very slowly but steadily, so that no trouble would be possible.

A third limitation comes through the weakness of the heart. Heavy breathing that sets in on account of this pose puts a strain not only upon the lungs but also upon the heart. This strain is increased by the burden of the abdominal viscera as these press upon the diaphragm. The result is that a weak heart grows weaker, and palpitations and other symptoms follow. It is only the injudicious use of the pose that is at fault under these circumstances. Because there is nothing in the Āsana itself that should strain a heart in normal health. People suffering from heart weakness should first strengthen their feeble organ by means of breathing exercises and then take up this pose for practice.

We shall note only one more limitation and conclude this lengthy note.

Nearly everybody knows what biliousness is, though one may not know the exact physiology of it. Now people having this complaint should never practise this Āsana in the morning. They should better choose the evening time, taking care to see that they allow at least three hours to pass between the last intake of food and the practice. If for some reasons the morning exercise becomes imperative, they should first take half a cup of milk, and then after half an hour start their exercise.

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If these precautions are not taken, there is every possibility of the pose promoting biliousness and consequent discomfort, for the following reasons.

The bile secreted by the liver is directly discharged into the small intestine, *only if* digestion is going on. But if the stomach and the small intestine are empty, as they generally are in the morning before anything is taken, the bile is not immediately required for digestion and is stored up in a sack called the *gall-bladder*. From this it flows into the intestine whenever it is required there for digestion. It is to be noted that the duct leading from the gall-bladder opens into the small bowel only within a few inches of the lower end of the stomach.

Now the gall-bladder is situated in the abdomen just below the liver, (Fig. XL); and is pressed hard by the folds of the intestines during S'īrshāsana. This pressure might force some of the accumulated bile into the small bowel and also drive it into the stomach. This bile flow is increased if the liver happens to secrete just at this time excessive quantities of the fluid.

The stomach is not the proper and natural place where the bile should be present. Naturally it is irritated and such symptoms as dull headache, nausea, loss of appetite etc., may be developed.

In the light of this information it will be clearly seen that all these troubles may be avoided by choosing the right time for practising this Āsana. The evening suits all constitutions, because some digestion is then going on in the small intestine; and even if bile is forced into it, the fluid is taken up for the digestive work, and generally does not find its way to the stomach. The same thing happens if some light food is taken early in the morning and the exercise is done after a few hours.

What is said of S'īrshāsana holds good in the case of almost all the muscular exercises. People having bilious tendencies

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would do well, therefore, to follow the instructions given here. The foregoing conclusions are based not only on our personal experience but also upon the experience of a number of our students, who could avoid the baneful effects of the bile simply by changing the time of their exercise.

We have elaborated these limitations with a view to put enthusiasts on their guard. The Āsana is as popular as it is important and the chances of its misuse are equally great. This discussion is expected to guide people in their work.

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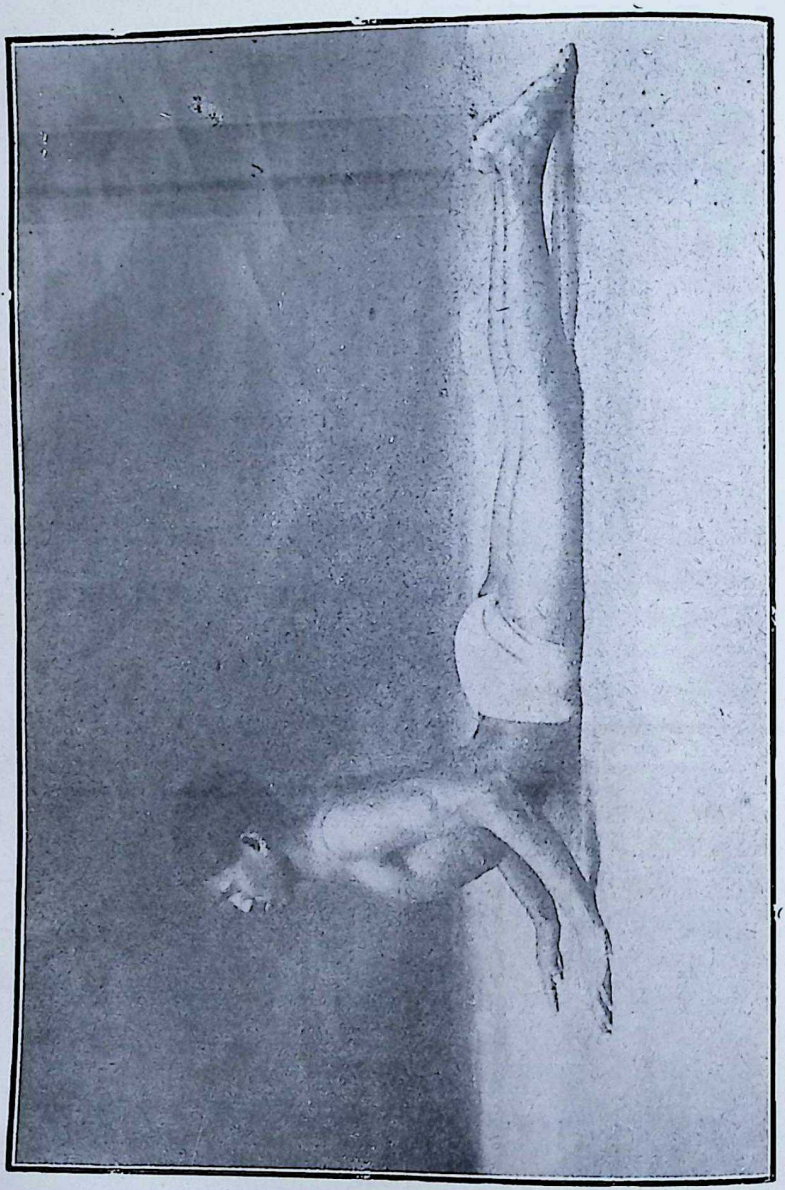

Fig. XLIX

Bhujangāsana or The Cobra Pose.
(Side view)

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BHUJAÑGĀSANA

or

THE COBRA POSE

THE NAME:—

This pose is called Bhujaṅgāsana because the full display of it gives one the appearance of a hooded snake with its neck dilated like a hood under irritation. (Fig. XLIX). Bhujaṅga means a cobra in Saṅskṛita.

THE TECHNIQUE:—

The student first lies prone on his seat with his muscles thoroughly relaxed and his mind concentrated as shown in Fig. LI. This picture, however, represents the student preparing himself for S'alabhāsana and not for the Cobra Pose which requires a somewhat different arrangement of the hands and forehead. While getting ready for the Cobra Pose the student touches the ground with his forehead; and keeps his hands, one on each side of the chest, bending them in the elbows. The soles are made to look upward.

The student then raises his head and bends the neck backward as far as possible. The chin is completely thrown out. During this attempt his chest is kept close to the ground, the trunk, so to say, taking no part in the movement. When the head is fully swung backward, the student begins to work the deep muscles of his back. By their contraction he slowly raises his chest. In the beginning he supports his rising thorax with his hands, gradually increasing the angle between his arm and forearm. But as he becomes accustomed to this practice, he tries to depend upon the muscles of the back alone for throwing back his chest; and though the hands are allowed to work as previously, com-

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paratively no burden is now put upon them. He does not give a full backward curve to his spine all at once; but tries to raise his vertebræ one by one, and marks that the pressure of the curve is travelling down the column step by step, till the thoracic part gets a good backward bent. Then he begins to use his hands more actively; and partly with their help and partly with the help of the deep muscles of the back, starts working the lumbar region. Lastly even the lumbar vertebræ are thrown backward in a curve and the whole pressure rests on the sacrum. Here the Āsana is completed, and the whole spinal column makes a deep curve as seen in Fig. L. The student tries to maintain this position from 15 to 20 seconds. Fig. XLIX represents the full pose. It is to be noted here that the backward bent of the neck has not been shown in the accompanying illustration, but is not to be neglected in practice.

During the full pose, the abdominal muscles and especially the two recti are stretched, and the intra-abdominal pressure is largely increased. If just at this time, an attempt is made to contract these muscles, it greatly helps to add to this pressure.

After maintaining the pose for the prescribed time, the student begins to efface the spinal curve and bring down his chest. Here too, he proceeds gradually in his work. First the lumbar curve is obliterated, each vertebra being relieved of its pressure which now travels upwards. The thoracic and cervical curves are effaced in the same way, till the whole spine lies in a horizontal line and the forehead touches the ground as it did originally.

The student, if he is a beginner, does not trifle with his breath during this exercise. It is allowed to flow as usual. But when he is advanced in his Yogic studies and knows how to control his breath, he tries to maintain full inspiration throughout the practice.

The exercise may be repeated three to five times with advantage.

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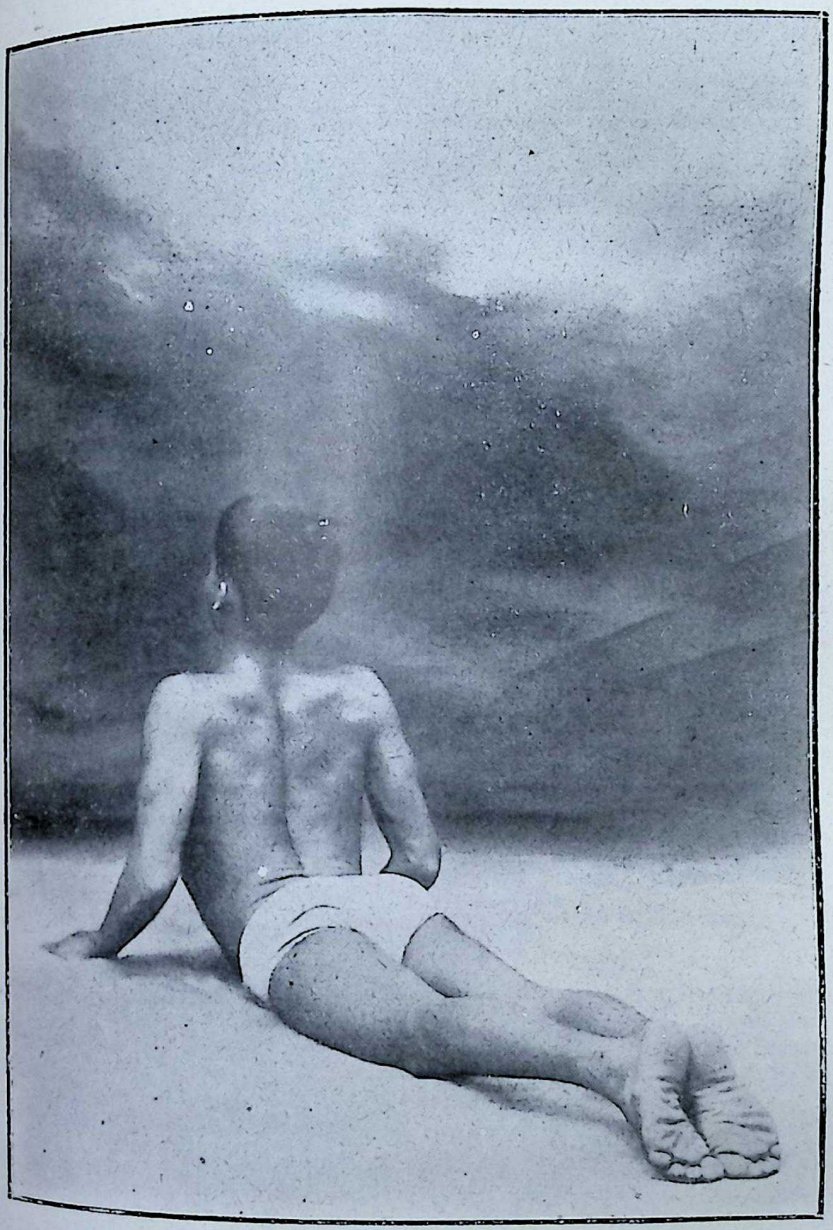
Fig. L



Bhujaṅgāsana or The Cobra Pose.
(Back View)

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No. 2]

POINTS OF STUDY :—

(a) *Muscles* :—

The deep muscles of the back are alternately contracted and relaxed in working out this pose both ways. The exercised muscles gain in health and keep the spine elastic. During their work these muscles induce a liberal blood supply by promoting blood circulation which is ordinarily somewhat slow in this part of the body.

This pose has such a good effect upon the deep muscles, that even a single successful attempt at it, relieves an aching back, if the pain is due to overwork.

A reference has already been made to the work of the recti in one of the paragraphs above.

(b) *Vertebrae* :—

The whole spine receives a steady pull anteriorly, every vertebra and its ligaments having their share in the work. If there be any slight displacement in the spinal column, it is adjusted to the normal condition.

(c) *Nerves* :—

All the 31 pairs of spinal nerves exit through the spaces left between every two adjoining vertebræ. The two gangliated chains of the sympathetic also stand imbedded in the muscles situated on the two sides of the spinal column. This exercise, by promoting the blood circulation of these parts, very favourably influences these nerves and helps them in maintaining their health and activity.

NOTE—

This and the next two poses are very good exercises for the spine. The elasticity of the spine means youth, its rigidity means old age. These exercises keep the spinal

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column fully elastic. Those people who find their spine alredy stiffened should start these exercises slowly. No jerks should be given. Jerks may injure the rigid muscles. What little bent is possible should first be secured and maintained for some time. After a while a deeper curve will become possible. In this way, with a daily practice, the spine can slowly be restored to its original state of elasticity.

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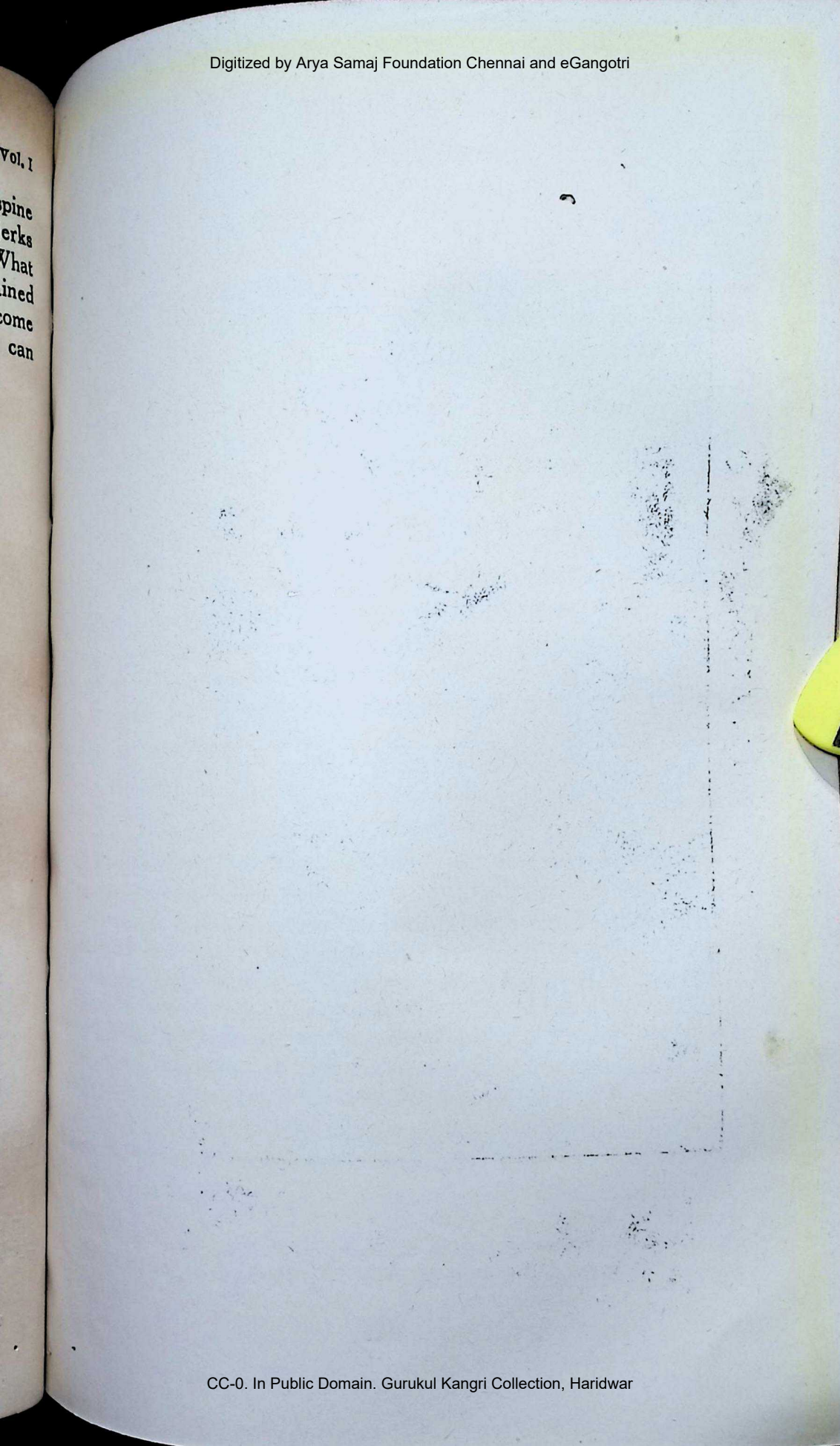

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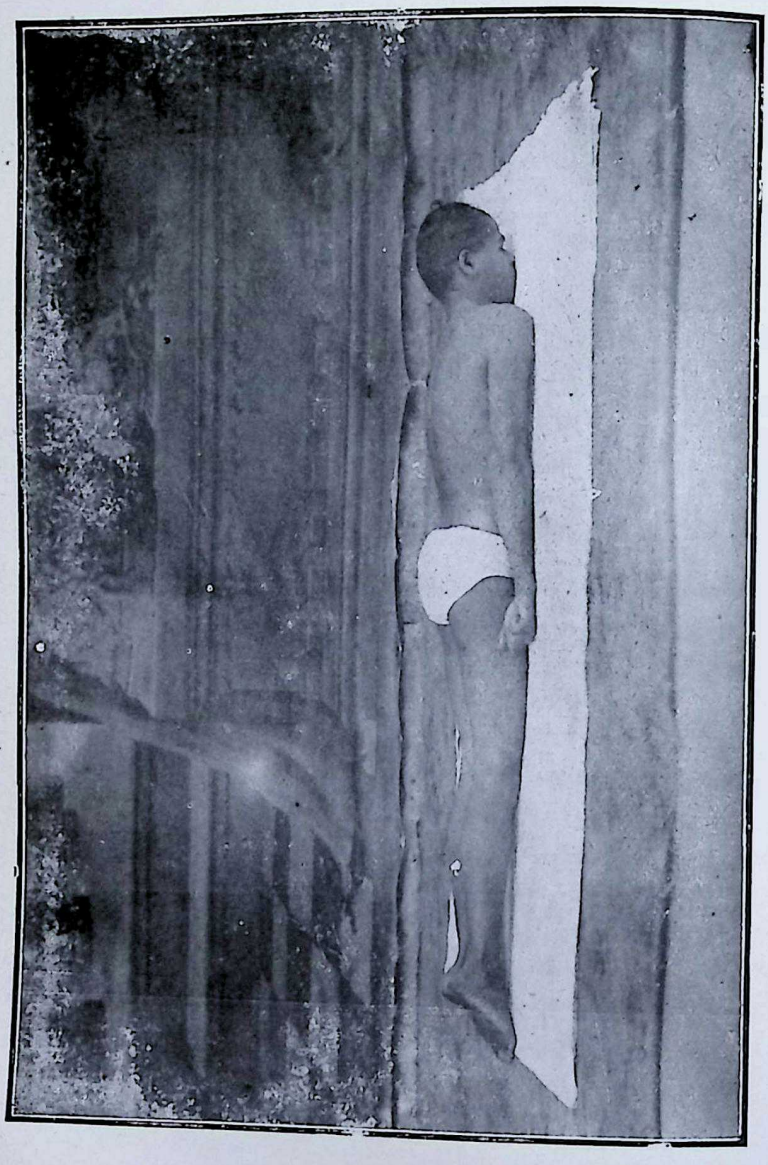

Fig. LI

Preparation for Śalabhāsana.

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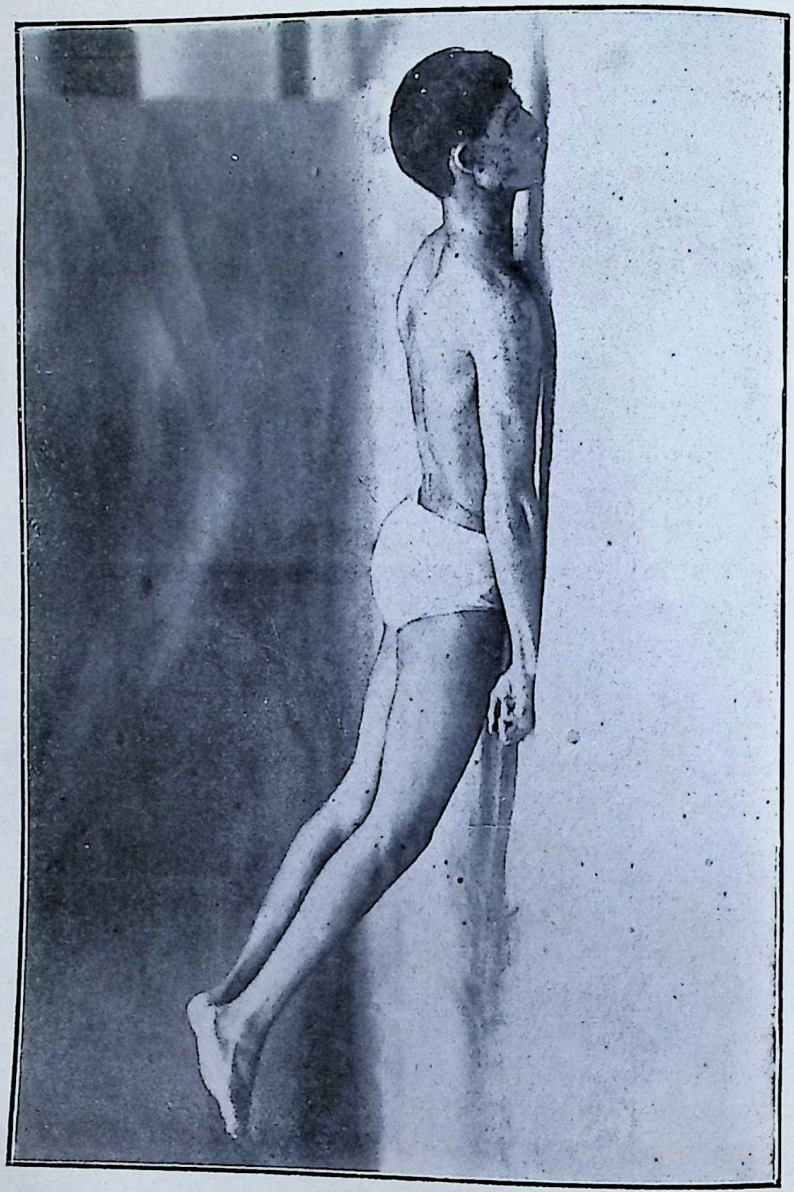

Fig. LII

Śalabhāsana or The Locust Pose.

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S'ALABHĀSANA

or

THE LOCUST POSE

THE NAME :—

The pose is called S'alabhāsana because its full show lends one the appearance of a locust with its tail standing at an angle with the ground. (Fig. LII). S'alabha means a locust in Sanskṛita.

THE TECHNIQUE :—

As illustrated in Fig. LI, the student lies prone on his seat with his soles looking upwards and his fingers clenched. He stretches his hands along his body so that his shoulders and the backs of his fists touch the ground. He either rests his chin, mouth and nose on his seat ; or his chin alone, the head being thrown a little backward. Then with a full inspiration he stiffens his whole body; and tries to raise his lower extremities backwards, putting his whole weight on the chest and hands. The wrists especially feel the burden of the upturned legs. Throughout the exercise the breath is held in and the knees are kept stiff. In this practice the sacrum shares the fate of the legs and is a little raised with them.

When the student finds that he can no longer hold in his breath, he slowly lowers down his legs, relaxes his muscles, and gradually proceeds to exhale. Here, as in other Ās'anas, there should be no jerks or sudden twists and turns. The whole bodily machine must work smoothly and uniformly.

The pose may be repeated twice or thrice with advantage. Care should be taken not to strain the lungs by unduly prolonging the posture.

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It may be readily seen that the trunk and the upper extremities that were put into action during the Cobra Pose, are kept to the seat in this posture; whereas the lower extremities that were passive in that pose, are actively used in this exercise.

POINTS OF STUDY:—

(a) *Muscles*:—

In this Āsana nearly the whole system of extensors[1] is contracted and of the flexors' relaxed. On account of deep inspiration, the diaphragm occupies the lowest possible level, and presses upon the abdominal viscera. The recti and the other three big muscles situated by their sides are somewhat relaxed, but the pressure of nearly the whole body is thrown upon the abdomen. As a result of all this, the intra-abdominal pressure is extremely high in this pose. The glutæus maximus and the levator ani are fully contracted.

(b) *Vertebræ*:—

The lower lumbar vertebræ and the sacrum are worked up.

(c) *Nerves*:—

The lower lumbar, sacral and coccygeal nerves get a good supply of blood through this pose.

---

1 Extensors are the muscles that straighten out the different parts of the body, those that bend them being called flexors. For instance, the muscles that help us in bending the hand at the wrist-joint and also in bending our fingers are the flexors. Opposed to these are the extensors. They enable us to straighten our hand and fingers. The muscles psoas and iliacus referred to in the 'Note on the Abdomen,' (p. 109), are flexors, because, by their contraction, they bend the hip-joint folding the thigh upon the abdomen. This flexing action of the psoas and iliacus is counteracted by the glutæus maximus which is an extensor. Forming the prominence of the buttocks, it opens out the folded thigh and enables us to maintain our trunk in the erect posture.

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No. 2]

NOTE—

The full inspiration required by this posture expands the lungs. They are again pressed upwards by the abdominal viscera where the intra-abdominal pressure is very high. This puts a considerable strain upon the heart. So beginners should proceed cautiously in this exercise, and those that have a weak heart or lungs should avoid it altogether. Even stout persons would do well to start with one attempt only. Great care must be taken about the time for which the pose is maintained. Slow but sure is a wise rule of conduct here as everywhere. Ardha-S'alabhāsana is only a changed form of this pose adapted to the needs of weaklings.

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ARDHA-S'ALABHĀSANA

or

THE HALF LOCUST POSE

THE NAME :—

The name is not taken from any of the original Yogic texts. It is coined by ourselves to express the adaptation of S'alabhāsana described in the following lines.

THE TECHNIQUE :—

As in the Locust Pose so here the student lies prone on his seat. But he neither attempts to control his breath nor to contract the extensors. He keeps the whole frame of his body in a relaxed condition. Then he tries to raise backward one of his legs, of course, after contracting the necessary set of muscles. This he does so slowly and steadily that little pressure is experienced except on the parts that are actually working. All the while the trunk and the other leg are kept close to the seat. After the upturned leg has described the greatest possible angle, it is slowly lowered down to its original position. Then the other leg is raised and taken through the same movements. Thus the two legs go on working alternately till the desired amount of exercise is done. Control of breath and stiffening of muscles may be introduced as the practice advances, care being taken to see that no strain is put upon the system on that account. After one feels strong enough to tackle the full Locust Pose, it should be taken up for practice.

POINTS OF STUDY :—

The bodily parts used for this Āsana are the same as those exercised in the full Locust Pose with slight differences. Hence the results are nearly identical except that the half pose is very slow in bringing about the necessary effects.

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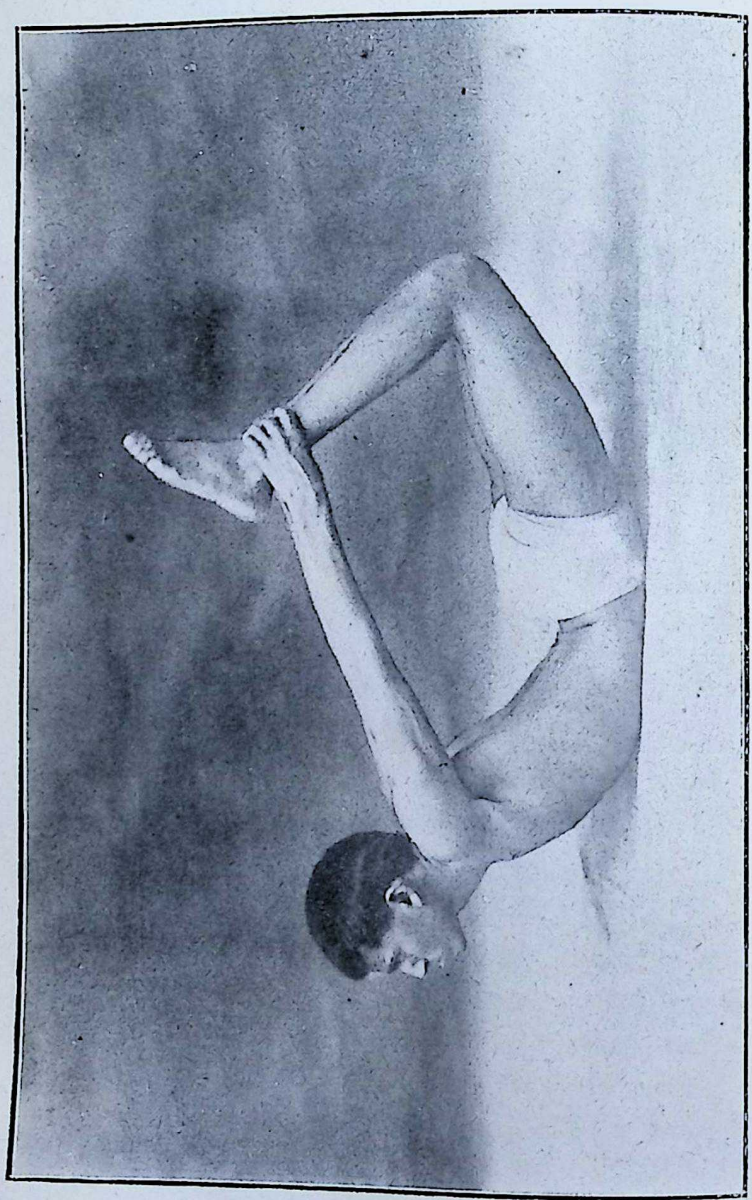

Fig. LIII

Dhanurāsana or The Bow Pose.
(Side view)

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DHANURĀSANA

or

THE BOW POSE

THE NAME :—

This is called the Bow Pose because in this posture the body resembles a bow with its string attached to it. The trunk and the thighs represent the bow proper, whereas the hands and legs take the place of the string.

THE TECHNIQUE :—

As in the previous poses, the student lies prone on his seat. He bends his legs in the knee-joint, till they are well folded upon the thighs; and are available to the hands that try to grasp them in the ankles. When the hands get a good hold upon the legs, the student tries to raise his trunk as well as his knees, till his whole body stands on his seat curving upwards both ways. The whole pressure of his body is thrown upon the abdomen, and the extremities are fully stretched as shown in Fig. LIII. At the end of the Āsana the chest and knees are lowered to the seat. The hands let go the legs which are straightened out, they themselves being made to lie on the two sides of the trunk.

This exercise requires a sudden movement of the body, and care should be taken not to sprain any joint. The Āsana may be maintained for something like five seconds to begin with, the period being increased afterwards according to capacity. During the practice breath may be allowed to flow as usual, or it may be controlled, if this could be done without any damage to the lungs. It is desirable for a novice to keep his knees apart, because thereby, he would be able to secure a greater

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curve for his body during this exercise. As the muscles become more and more elastic, the knees should be drawn closer, till at last they are made to stand together, carrying the intra-abdominal pressure to its highest limit. In Fig. LIII the knees are shown close to each other. Fig. LIV gives a back view of the posture.

POINTS OF STUDY :—

It will be readily seen that this posture is a combination of the two exercises, Bhujaṅgāsana and S'alabhāsana. Hence the points of study are nearly the same as in these two poses. Naturally it claims the advantages of both, though on a humbler scale. The intra-abdominal pressure here is not as great as in the Locust Pose; because, even with full inspiration, the diaphragm does not press upon the abdominal viscera as tightly in this practice as in S'alabhāsana. The deep muscles of the back are exercised much better in Bhujaṅgāsana than in this pose; because there they are *mainly* responsible for the backward curve of the trunk, whereas in this pose their work is largely done by the hands and legs tugging at each other. Again the wave of contraction and relaxation travelling up and down the spinul column which forms the principal feature of Bhujangāsana is missed here. But this pose has a special advantage which cannot be had of the two that are combined in it. The two recti as well as the other muscles of the abdomen that flex the hip-joints, are fully stretched, in this pose, as the thighs are pulled back by the tugging hands. Again as the pull can be adjusted to the requirements of every individual in this pose, the Āsana may be practised by all persons whether strong or weak.

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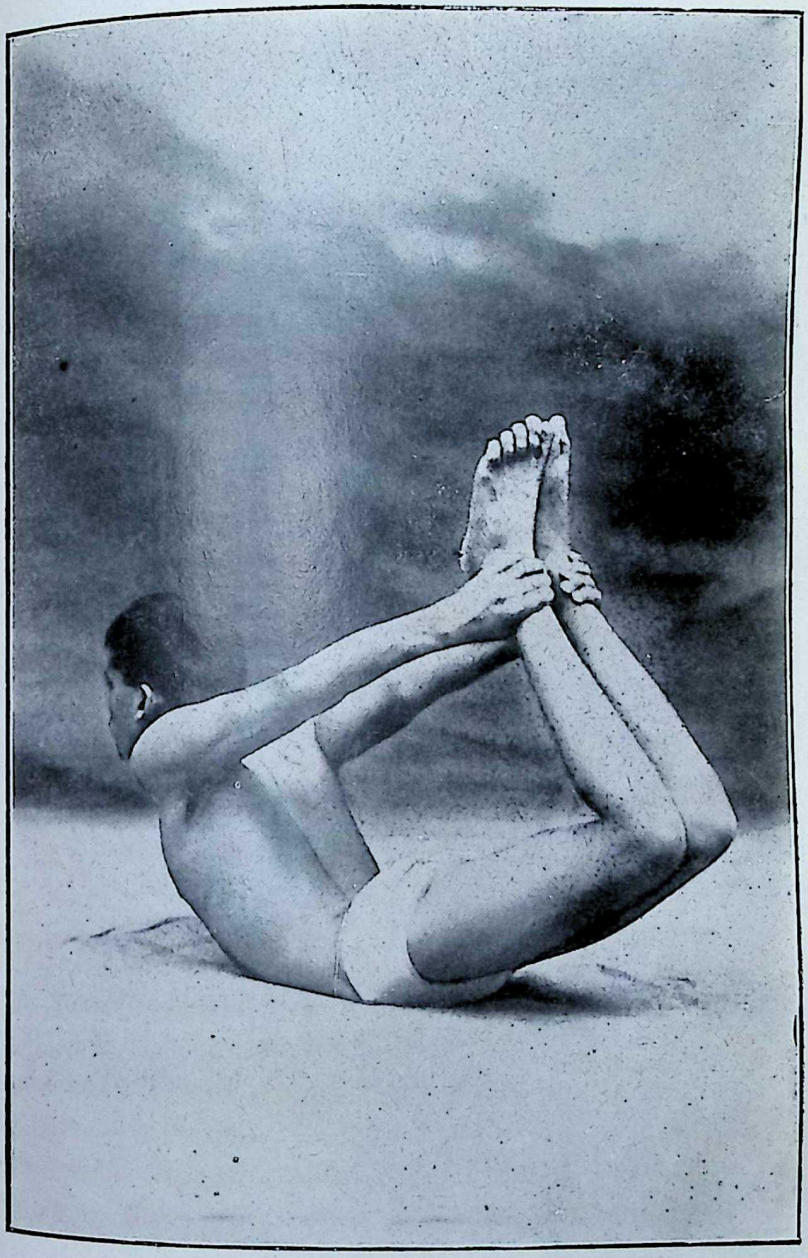
Fig. LIV



Dhānurāsana or The Bow Pose.
(Back View)

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Miscellaneous

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Following diseases, especially in their chronic condition, can be effectively treated by the Yogic methods :

1 *Constipation*
2 *Dyspepsia*
3 *Head-ache*
4 *Piles*
5 *Heart-disease (functional)*
6 *Neuralgia*
7 *Diabetes*
8 *Hysteria*
9 *Consumption*
10 *Obesity*
11 *Sterility (certain types)*
12 *Impotence*
13 *Appendicitis, &c.*

Therapeutical advice is given gratis at the Āś'rama to patients coming for consultation.

Arrangements have been made under the supervision of the Āś'rama for patients to stay on payment of actual expenses, Rs. 45/- per mensem.

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A FEW PRESS NOTICES

THE MAHĀRĀSHTRA, NAGPUR.

October 22, 1924.

"The aims and objects of this journal together with the experimental and critical scientific information given in the first number, clearly indicate the importance of this quarterly. Physical culture is being subjected to experimentation in America, and the periodicals of that country publish scientific criticism on the results. Experimental evidence shows that Yoga is not a mystical nonsense, but that it largely influences the physical and mental development of man. American and European physical culturists are busily engaged in propounding theories in this regard. But in India, like all other ancient cultures, Yoga has come to a standstill; and the educated Indian does not attach the least importance to it. Under these circumstances, the work started by Shrimat Kuvalayānanda deserves not only our congratulations, but also our support. The scientific character of his work is placed beyond all doubts, as he makes no concession for blind faith. *Yoga-Mimansa* is the first journal in India publishing scientific and experimental criticism on Yoga. The magazine edited by Shriyut Aravind Ghose discussed only the philosophical aspect of Yoga. And although his discussions took into account modern discoveries, they did not record any new experimental evidence, in spite of the fact that such evidence was rendered essential by the vital relation which Yoga has with both mind and body. The work of Shrimat Kuvalayānanda is more comprehensive and progressive. Hence it is the duty of every educated and monied Maharashtriya to help this scientific study of Yoga." *

THE BOMBAY CHRONICLE, BOMBAY.

October 26, 1924.

"We welcome the first issue of the magazine. It publishes with copious illustrations some of the researches on the

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Yogic System of physical culture carried on according to modern scientific methods....

"The present number is devoted solely to Hatha-Yogic exercises or things physiological, and does not contain even one article on Yoga proper, that is, mental and spiritual culture. It will not, therefore, be surprising if some of the readers get this wrong impression that Yoga is only a system of physical exercise and nothing else. The Kaivalya-dhāma's attempts in carrying on physiological researches are very laudable, as health is the primary requisite of spiritual life. But it would be a pity if the whole energy of the institution is spent up in conducting investigations only on physical culture and therapeutics."

THE INDIAN SOCIAL REFORMER, BOMBAY.

November 1, 1924.

"The Ashrama Kaivalyadhāma, in Lonavla, has started a quarterly journal called the *Yoga-Mimansa*, with the object of expounding the Yoga system from a physiological point of view. In the first number several photographs are given of the Yogic postures, but the most interesting are the radiographs showing the changes produced in the body by the exercises. The journal is edited by Shrimat Kuvalayānanda (Prof. J. G. Gune). While we welcome the attempt to investigate the ancient system by experimental methods, we think a word of warning is necessary against laymen trying to practise Yoga from the descriptions and photographs contained in the journal. Such a warning is implied in the *Editorial Notes*.... But it is desirable to have a more explicit caution to laymen against trying to dabble in Yogic practices without proper guidance."

UNITED INDIA AND INDIAN STATES, DELHI.

November 22, 1924.

"The importance of Yoga as an art of healing was long recognized in India, and it was practised especially by

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the Yogins for curing ailments which arose out of irregularities in Yoga practices. Though the ordinary diseases were treated according to Hindu medical science called Āyurveda, men suffering from incurable diseases had to be placed under the Yogins as their last chance for a cure, and the results in many cases used to be miraculous. Yoga for centuries was an unwritten science whose field of operation was restricted to the subjective world, and physical culture or physiological side of it was only a stepping stone.... It must be said to the credit of the Ashrama Kaivalyadhāma of Lonavla that it has started research in this direction, and it is for the first time that Yoga is being subjected to scientific experimentation and results already arrived at promise of a bright future.

"The idea is as novel as it is laudable. Like Radio Therapeutics the Yogic Therapeutics have a great future before them, and the scope of the latter is certainly much wider than the former.... But a big and delicate undertaking like that is naturally an expensive one and much of its success will depend on the full hearted sympathy and support of the public."

CURRENT THOUGHT, TRIPLICANE, MADRAS.

November, 1924.

"The objection is frequently raised against Indian Yoga and philosophy that the truths enunciated therein, though based on subjective spiritual experience, have not been examined by the tests of modern experimental science. This defect is sought to be removed by the Kaivalyadhāma, an Ashrama founded in the beautiful heights of Lonavla to carry the spirit of modern scientific research and method of psycho-physiology into the field of Yoga and philosophy. This is a great and noble task pregnant with immense possibilities for the expansion of knowledge and the spiritual and material welfare of mankind. Lovers of Truth, and particularly those who wish to see India's ancient and priceless treasures of wisdom vindicated before the modern world of science and utilized for the welfare of the world, have no better cause to encourage."

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NAVA-SANGHA, CHANDERNAGORE.

December 21, 1924.

"The Kaivalyadhāma Ashrama from which the organ is published thus appears to be doing very important work, having for its main ideal the co-ordination of Western and Eastern self-culture and discipline, which have long proceeded along separate currents, unrecognisant of each other. This integral ideal of wedding together the divorced tendencies of exclusive materialism of the scientific Western world and the exclusive spirituality of the Eastern Yogins is quite in tune with the spirit of the age and makes the Ashrama deserve our fullest brotherly sympathy. It is a bold venture and we wish every success to the noble enterprise undertaken by the organizer, for his success means a new and synthetic vindication of Indian thought and culture to a proud yet doubtful modern world.

"This October number of the quarterly magazine is rich both in style and matter and so far leaves nothing to be desired. One of its main features lies in its copious illustrations, representing Yogic details about Asana, nervous Chakras, etc.—a subject hitherto confined to mystical literature—which has been brought before the popular gaze as a highly instructive and exhaustive field of study and placed under careful scientific treatment, experiment and interpretation."

THE VIVIDHAJNĀNAVISTĀRA, BOMBAY.

December, 1924.

"We are sincerely sorry to note that the purely vernacular reader cannot take advantage of this beautiful journal. The treatment of subjects is based on personal experience. Copious illustrations are given. This has made the whole exposition so easy that there is little difficulty in understanding the subject. This work of Shrimat Kuvalayānanda is extremely laudable and deserves to be patronized." *

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THE BHISHAGVILĀSA, AHMEDNAGAR.

January, 1925.

"Medical men educated both in the modern and ancient fashions, are likely to be greatly benefitted by the researches recorded in the *Yoga-Mimansa*. We believe that the method of treatment adopted in the Yoga-Mimansa will be of great help in understanding the secrets of the Tridosha Theory. The researches of the Kaivalyadhāma are sure to solve some of the riddles of the modern medical science." *

THE TATVAJNĀNAMANDIRA, AMALNER.

January, 1925.

"It is a matter for congratulations that Shrimat Kuvalayānanda has founded an institution for a critical study of Yogic culture. His researches in the path of Yoga and his explanations of the Yogic problems from the view point of the present day sciences, are altogether a new activity in this country. Even if we ignore the spiritual aspect of Yoga, its physical culture side and therapeutics are, in themselves, of great importance. As the journal is being published in English, it will help not only all the Indian provinces but also the foreign countries to study the subject." *

ANNALS OF THE BHANDARKAR ORIENTAL RESEARCH INSTITUTE, POONA.

March, 1925.

"Without showing our scepticism as to whether the Western laboratory methods of research can be made to reveal spiritual wonders, we may congratulate the editor on his attempt to develop the objective character of the Indian Philosophy by subjecting the spiritual experiences of man to experimentation. Apparently the Director of the Kaivalyadhāma believes in the principle that whatever exists, exists in some

* These reviews are faithful English renderings of the original vernacular.

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quantity and what exists in quantity can be measured. Statements of a purely speculative nature if corroborated by laboratory experiments will acquire scientific value and more light will be thrown on the nature of the Yogic psychosis which are at present regarded as quite mystical. Psychology in its relation to other sciences such as Physiology needs to be studied without merging the one into the other and the efforts of the Kaivalyadhāma will, therefore, be awaited with eagerness by all interested in such studies."

PROGRESS OF EDUCATION, POONA.

July, 1925.

"Tradition tells us that the Yogis of yore worked miracles; but the wonderful science has remained to us a sealed book partly because it is believed that a misdirected attempt to probe into its secrets leads to disastrous results and partly because of the scepticism of the twentieth century. The journal *Yoga-Mimansa* aspires to give the necessary directions to the needy and remove the scepticism by demonstrations in the language of modern sciences.... Being profusely illustrated the journal has an inviting appearance. The contents are beyond our ken and we would not risk comments on them. We wish the editor every success in his noble enterprise."

PRABUDDHA BHARATA, CALCUTTA.

October, 1925.

"This magazine is published to record the result of research done on a scientific basis in the realm of Yoga Philosophy. The experiences of a Yogic life have never been subjected to scientific experimentation, and for the first time an attempt has been made in that direction from the Ashrama founded by the Swami. In the volume before us are given various poses with copious illustrating pictures, which may cure many chronic diseases. This is properly the province of Hatha-Yoga, a science which has got a bad reputation as

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encouraging only mystery and miracle-mongering. The author's scientific treatment of the subject will clear all prejudices from the public mind and enable people to test it for themselves. We wish success to this altogether a new enterprise."

NATUROPATH, NEW YORK CITY.

August, 1925.

"In appearance, language and style it reminds one of the staid old London scientific quarterlies; the photographs and X-Ray pictures with which it is abunduntly illustrated also create the impression at first that one is dealing with a product of modern Western civilization instead of an organ of Hindu culture.

"The comparatively high civilization of the ancient inhabitants of India is of course sufficiently important to us, Westerners, to have caused a not uncommon acquaintance with Yogic culture on the part of the educated classes of Western societies. And right here it is where you will at first be somewhat baffled, reading this debut number of the *Yoga Mimansa*, especially if you omit perusing the opening remarks on the inside of the covers, because you would expect to see something quite different from physical exercises and a study of their effects. The Editorial remarks, however, explain that although Yoga is mainly spiritual, it teaches excellent system of therapeutics and physical culture; and the latter, minor side of Yoga science, has been singled out for a thorough study, while the spiritual side connected with it will be taken up later.

"In the first issue two exercises have been chiefly dealt with; *Uddiyana*, for raising the diaphragm, and *Nauli*, by which water is raised into the colon without any external mechanical help, hitherto explained as due to anti-peristaltic action, but which the Ashrama has experimentally shown to be caused by a vacuum created in the colon.

"The entire scope of action planned for the Institute and its quarterly is not entirely clear, but we are evidently dealing with a publication well worthy of serious attention."

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A PERSONAL APPRECIATION

PROF. R. D. RANADE,

Director, Academy of Philosophy & Religion, Nimbal.

August 10, 1925

"My opinion about the Yoga-Mimansa has been that it definitely supplies a felt need. The get-up of the journal leaves nothing to be desired. The art pictures are excellent and you are not sparing yourself any trouble in conducting that magazine. The physiological side of Yoga had to be tackled by somebody, and you have done it most ably. I am sure physiologists and men of medicine would have to take your researches and expositions into account. You are probably opening to their vision something entirely new. One feels constant wonder how you should have amassed so much insight into psycho-physiology during the last few years. I am sure also, that your work, as embodied in the Yoga-Mimansa will certainly influence the students of Experimental Psychology and Physiology in course of time. There is no journal of the kind you are editing in the whole of India, and I wish your endeavour every success."

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Yoga-Mīmansa

A Quarterly Organ of the Kaivalyadhāma

Recording Scientific Researches

IN

Psycho-physiology, Spiritual and Physical Culture etc.,
with their application to Therapeutics.

Each number covers 80 pp. of the royal octavo size including 16 full page illustrations. The matter is divided into four different sections so as to meet the needs of all types of readers. Fourth Volume will begin in April 1930.

Annual Subscription, Post Free, Per Volume & Single Copy respectively: India Rs. 7 & 2 (V. P. Charges annas 4 extra); America $ 3.50 & 1.00; other Foreign Countries Sh. 15 & 4.

N. B.—Volumes I–II Complete, Each sells as follows: India Rs. 9 (V. P. Charges annas 4 extra); America $.4.00; other Foreign Countries Sh. 17. Post Free. Vol. III Complete will be sold for its original price up to the end of June 1930; afterwards its price will be the same as of the first two volumes. Single copy not available.

A FEW APPRECIATIONS

"During the last few years a gallant attempt has been made, under the supervision of Swami Kuvalayananda to carry out a systematic and practical study of Hatha-Yoga, by applying to it Western methods of observation, with a view to demonstrating its *raison d'e'tre* and its high therapeutic value. The results of these studies by Indian practitioners have been appearing in his very valuable periodical called *Yoga-Mimansa*." **The Quest, London.**

"Physical culturists, medical men, experimental psychologists and those who are classed as general readers should find the periodical interesting and instructive." **The Modern Review, Calcutta.**

"The object of the journal, which is full of novel and interesting subject matter from the beginning to the end, is to record scientific researches in physiology, spiritual and physical culture etc., with their practical application to therapeutics. We are quite proud to emphasise the fact that the Swamiji has fully succeeded in his mission. The magazine is for everybody. The various poses and practices of Hatha-Yoga with their utility in curing different diseases have been well described and illustrated with excellently done up half-tone photographs. We wish the journal every success."

The Journal of Ayurveda, Calcutta.

"From its general appearance and get-up of the journal and the matter it contains one can see that the work is in able hands and in time the institution will be as useful and popular as the New York Institute of Science."

United India & Indian States, Delhi.

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ॐ

सोऽहम् ।

Yoga-Mīmāṅsā

EDITED BY

S'RĪMAT KUVALAYĀNANDA

(J. G. GUṆE)

July, 1925
Third Impression

Vol. I No. 3

KAIVALYADHĀMA
Post—LONAVLA
BOMBAY—INDIA

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ओ३म्

पुस्तक संख्या.....

पञ्जिका संख्या.....

पुस्तक पर सर्व प्रकार की निशानियां लगाना वर्जित है। कोई सज्जन पन्द्रह दिन से अधिक देर तक पुस्तक अपने पास नहीं रख सकते। अधिक देर तक रखने के लिये पुनः आज्ञा प्राप्त करनी चाहिये।

सर्वे खल्विदं ब्रह्म।
All this is indeed Brahman.

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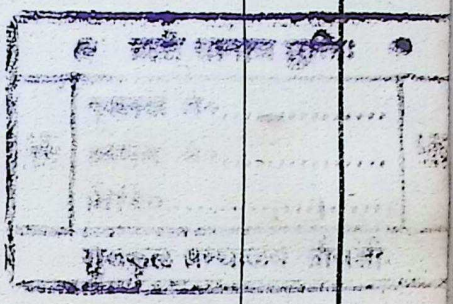
तदेकोऽवशिष्टः शिवः केवलोऽहम् ।

I alone persist : Blissful : Absolute.

ॐ

सोऽहम् ।



Yoga-Mīmānsā

सर्वं खल्विदं ब्रह्म ।
All this is, indeed, Brahman.

नेह नानास्ति किञ्चन ।
There is nothing here apart from it.

EDITED BY

S'RĪMAT KUVALAYĀNANDA

(J. G. Gune)

July, 1925
Third Impression

Vol. I No. 3

KAIVALYADHĀMA

Post-Lonavla

(Bombay-India)

शरीरमाद्यं खलु धर्मसाधनम् ।

Surely Health is the primary requisite of spiritual life.

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First Published, July, 1925.
Second Impression, September, 1926.
Third Impression, August, 1930.

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ॐ

तदेकोऽवशिष्टः शिवः केवलोऽहम् ।

सोऽहम् ।

YOGA-MĪMĀṄSĀ

VOL. I JULY, 1925 NO. 3

Editorial Notes

May the Maker of all make this journal a success. Blessed is the name of the Lord. May He bless the workers of the Āśrama with a happy and prosperous career as servants of the world which is only the Lord Himself objectified. May He, that has created us in His infinite wisdom lead us to the light that is beyond all darkness.

◈ ◈ ◈

We are glad to note, however, that in spite of the delay that had occurred in the publication of the second number and has also occurred in the publication of the third, the popularity of the journal is steadily increasing. New subscribers are being registered almost every day; and if the journal is properly advertised, the subscribers' list is sure to swell much more rapidly. People do not put much faith in paper advertisements. Again the work of the Yoga-Mīmāṅsā is altogether of a new type. The result is that people cannot appreciate the worth of the paper, unless they see it with their own eyes. Cases are reported to us of gentlemen who had no time, or perhaps no mind, even to look into the magazine; but who afterwards actually became subscribers, when they were induced

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to peep into a few pages of it. To-day the subscribers of the journal are scattered throughout the length and breadth of India. If everyone of them tries to get at least one friend of his to take active interest in the work of the periodical, it will be a great help to the Āśrama and to the cause of Yogic culture. May we request our readers to do this much for us?

◈ ◈ ◈

This does not mean that our present custom is in any way disappointing to us. Nay, the subscribers' number has grown beyond our expectations, so much so that the first issue has gone out of print long since; and we have been required to make arrangements for getting ready its second impression. But happy as this circumstance is, we wish it to be happier still. We want the organ to be entirely self-supporting. Had we carried out our original plan of publishing the magazine in the demy octavo size and of giving only 80 pp. *including* sixteen full page illustrations, the Quarterly would have completely paid its own way, with the number of subscribers we have registered upto now. But we are giving much more than we originally proposed, with the result that the cost is almost doubled. Is it too much, under such circumstances, to expect our readers to widen their circle by enlisting the active sympathy of some of their friends?

◈ ◈ ◈

As we are happy in the case of our journal, so we are about our therapeutical work. The curative activity of the Āśrama is being appreciated more and more every day. In the last issue we had announced that arrangements were made at the Āśrama for students and patients to stay on payment of actual expenses. But during the last three months there was such a rush in the institute that its accommodating capacity was very cruelly taxed. Hence we are making arrangements

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to reserve the present bungalow of the Āśrama for patients and to house students in another decent building. This will give both these classes of people more privacy and greater comfort.

As has been more than once declared, through the pages of this journal patients have to pay no charges either for consultation or for treatment. The only expenses they have to bear are for their boarding and lodging, which amount to Rs. 45/- *per mensem*, Lonavla living being somewhat costly.

This side of activity of the Āśrama affords a rich field for clinical experimentation. We, therefore, heartily wish that a larger number of people took interest in the therapeutical side of Yoga. The results of Yogic clinics are so encouraging that our hope of their future is getting brighter and brighter every day.

The number of people visiting the Āśrama, purely for physical or spiritual culture, is also steadily on the increase. The physical culture side of Yoga is likely to be extremely popular, if arrangements are made at different centres for imparting instruction in this department. The Āśrama hopes to undertake this work soon, provided the institution gets a good financial support.

We wish to admit a few permanent students to the Āśrama, about 10 in number. These should be such as would lead exclusive Yogic life upto their 36th year, all this time maintaining strict celibacy. Sound in body and mind they should not be older than 18. These will be fed and clad by the Āśrama throughout their career. We shall feel highly obliged to our

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readers, if they direct deserving youths to us, for being taken up to be coached in Yoga.

◈ ◈ ◈

Our heart-felt thanks are due to the editors of the papers and periodicals we are receiving in exchange of our journal. A long list of these papers will be found in the pages of the Miscellaneous Section. It will be readily seen that these by themselves will make a fine reading room. But we subscribe many more of these and the reading room of the Āśrama is an attractive feature of the institution.

◈ ◈ ◈

Many appreciations have appeared in the press during the last four months. Some of them have been included in the Miscellaneous Section. We tender our cordial thanks to the writers of these. Special thanks are due to the reviewer of our journal in *The Bombay Chronicle*. We fully appreciate the tenderness with which this reviewer loves the higher side of Yoga. As regards his keenness to see this phase of Yoga being discussed in our journal and also as regards his fear that we are promising too much to the public, we have to request our friend to wait and see. Ours is a research work. What conclusions it will lead us to, we ourselves do not know. Under such circumstances *patience* is the only advice we can humbly give to our brother.

◈ ◈ ◈

We cannot adequately express our gratitude to the general public for the extreme kindness with which we are treated everywhere by them. When we started our work we rarely dreamt that it would meet with all the intellectual appreciation that it is getting to-day. As our work advances, we are sure we will endear ourselves to everyone in the land; and shall be given very wide opportunities to serve humanity.

◈ ◈ ◈

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Dr. Chandrachūd, the Chief Medical Officer, Baroda State, and Dr. Bhatta, the Baroda X-Ray expert, are rendering great services to the cause of Yoga by allowing us every facility for our X-Ray work. We respectfully offer our heart-felt thanks to both of them.

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N. B. — Those of our readers that claim no acquaintance with anatomy and physiology will do well to read The Semi-Scientific Section first.

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The Scientific Section

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SYSTEM OF TRANSLITERATION

Letters, their sounds, and a description of these sounds :—

अ	A	Pronounce	'A'	like	'u'	in	'but'.
आ	Ā	„	'Ā'	„	'a'	„	'far'.
इ	I	„	'I'	„	'i'	„	'pin'.
ई	Ī	„	'Ī'	„	'ee'	„	'feel'.
उ	U	„	'U'	„	'u'	„	'fulsome'.
ऊ	Ū	„	'Ū'	„	'oo'	„	'wool'.
ऋ	Ṛ I	„	'Ṛ I'	„	'rö'	„	German.
ॠ	Ṛ Ī	„	'Ṛ Ī'	„	„	„	„ with a strong accent.
ऌ	Ḷ I	„	'Ḷ I'	„	'lö'	„	„
ए	E	„	'E'	„	'a'	„	'fate'.
ऐ	AĪ	„	'AĪ'	„	'ai'	„	'aisle' but not drawled out.
ओ	O	„	'O'	„	'o'	„	'over'.
औ	AU	„	'AU'	„	'ou'	„	'ounce' but not drawled out.
क	KA	„	'K'	„	'k'	„	'kill'.
ख	KHA	„	'KH'	„	'kh'	„	'ink-horn' or like 'ch' in 'Loch' (Scottish).
ग	GA	„	'G'	„	'g'	„	'girl'.
घ	GHA	„	'GH'	„	'gh'	„	'log-house' or 'ghee'.
ङ	N̄A	„	'N̄'	„	'n'	„	'king' or 'link'.
च	CHA	„	'CH	„	'ch'	„	'church'.
छ	CHHA	„	'CHH'	„	the second 'ch' in 'churchill'.		
ज	JA	„	'J'	„	'j' in 'join'.		
झ	JHA	„	'JH'	„	'palatal 'z' as in 'azure'.		
ञ	N'A	„	'N"	„	'n' in 'pinch'.		
ट	Ṭ A	„	'Ṭ'	„	't'	„	'tub'.
ठ	Ṭ HA	„	'Ṭ H'	„	'th'	„	'pot-house'.

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SYSTEM OF TRANSLITERATION

Letters, their sounds, and a description of these sounds :—

ड	ḌA	Pronounce	'Ḍ'	like	'd' in 'dog'.
ढ	ḌHA	"	'Ḍh'	"	'dh' " 'mad-house'.
ण	ṆA	"	'Ṇ'	"	'n' " 'splinter' or 'and'.
ट	ṬA	"	'T'	"	dental 't' as in 'thin', or like the French 'T'.
ठ	THA	"	'TH'	"	'th' in 'thunder'.
द	DA	"	'D'	"	'th' " 'then'.
ध	DHA	"	'DH'	"	'th' " 'this'.
न	NA	"	'N'	"	'n' " 'no'.
प	PA	"	'P'	"	'p' " 'paw'.
फ	PHA	"	'PH'	"	'ph' " 'top-heavy', or 'gh' in 'laugh'.
ब	BA	"	'B'	"	'b' " 'balm'.
भ	BHA	"	'Bh'	"	'bh' " 'hob-house'.
म	MA	"	'M'	"	'm' " 'mat'.
य	YA	"	'Y'	"	'y' " 'yawn'.
र	RA	"	'R'	"	'r' " 'rub'.
ल	LA	"	'L'	"	'l' " 'lo'.
व	VA	"	'V'	"	'w' " 'wane'.
श	S'A	"	'S'	"	'sh' " 'ashes'.
ष	SHA	"	'SH'	"	a strong lingual with rounded lips.
स	SA	"	'S'	"	's' in 'sun'.
ह	HA	"	'H'	"	'h' " 'hum'.
ळ	ḶA	a dento-lingual pronounced with a little rounding of lips.			

Visarga—Ḥ ; Nasalized म् as in संयम—Ṁ ;
Nasalized म् as in मीमांसा—Ṅ.

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X-RAY EXPERIMENTS ON NAULI

EXPERIMENT II[1]

OBJECT OF THE EXPERIMENT :—

One object of the experiment was to study the normal position of the colon when loaded with a pint of opaque solution, with a view to contrast it with its positions under three different aspects of Nauli as illustrated in Figs. XXXVI, XXXVII and XXXVIII in the last issue. The other object was to note the distribution of the opaque solution during the normal position of the colon and during its positions under different aspects of Nauli, in order to compare and contrast them, for understanding the effects of Nauli on colon contents.

PREPARATION OF THE SUBJECT :—

The subject was a youth running his twenty-second year. He was in full enjoyment of health and had a training of about 7 months in Nauli. On the day previous to the experiment, he took his usual meal at about 12 noon. He had a cup of milk in the evening and a moderate dose of an organic laxative at bed-time. He slept well over night and had a clear motion the next morning. In order, however, to secure complete clearness of the colon, the subject had it flushed with four pints of tepid water by means of an enema at about 8 a. m. The experiment started nearly at 9-30 in the morning.

THE INJECTION :—

This was prepared and administered almost after the manner advocated by Haenisch for the investigation of the large bowel. We use the world *almost*, because we used a smaller proportion of water in order to make the injection thicker with a view to make it more opaque. The proportion recommended by Haenisch has been given on p. 15 of this volume. We took

[1] The first experiment has appeared on p. 91 of this volume.

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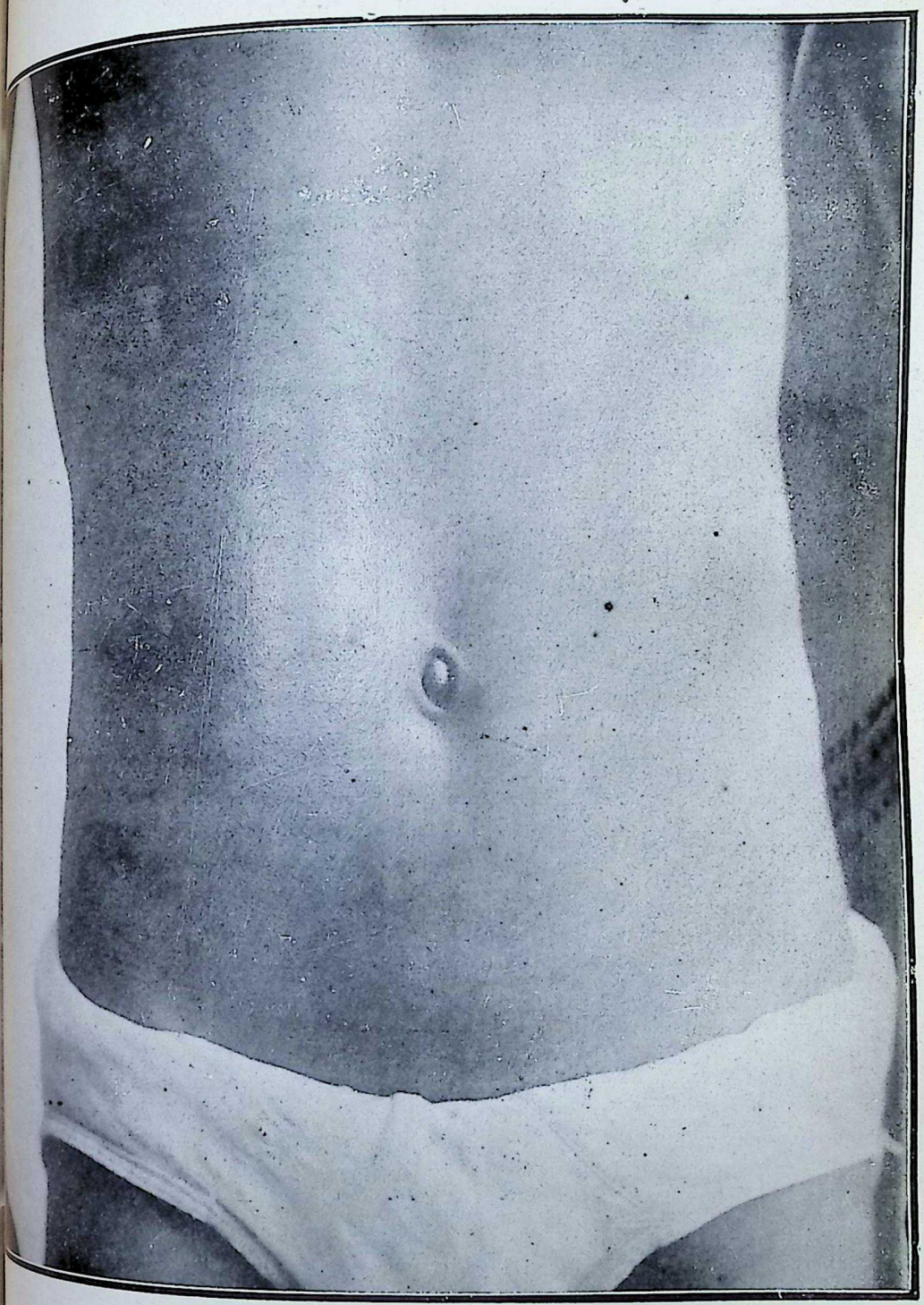
Fig. LV



Normal Abdomen.
(External view)

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[No. 3]

6 ounces of barium sulphate and 6 ounces of kaolin, and thoroughly mixed it with 10 ounces of warm water. Out of the solution thus prepared only a pint was used for the purpose of this experiment.

THE EXPERIMENT PROPER :—

The injection was given through the rectum while the subject was lying on his back. He could feel its passage as far as his transverse colon. We did not screen him, however, as in the first experiment on Uḍḍiyāna (vide p. 20 of the current volume), but simply got him to practise Nauli, fully trusting that a round of this exercise would distribute the opaque liquid over every part of the colon. How far this trust was justified can be clearly seen from Radiograph V which was taken immediately after Nauli.

While being skiagraphed, the subject was made to sit erect on the edge of the X-Ray table, with his legs resting on a foot-stool lower below. The X-Ray tube was arranged behind his back and the plate was placed in front of his abdomen.

This and the next three radiographs have been taken in this position, and as such afford accurate data for comparison. One factor, however, we could not keep constant throughout the four experiments—the factor of distance between the plate and the tube. The different aspects of Nauli required the subject to bend forward a little. This naturally increased the distance between the tube and the plate, the latter recording broader shadows in consequence. This circumstance must be taken into account while comparing the results of these four experiments.

NOTE—

The radiographs printed in this issue were all originally of 12″ × 10″. They have been subsequently reduced to 6″ × 5″ size for the convenience of this journal.

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REFERENCES TO RADIOGRAPH V

1 The Iliac Bones.
2 The Sacrum.
3 The Tenth Ribs.
4 The Eleventh Ribs.
5 The Twelfth Ribs.
6_{11} The Eleventh Dorsal.
6_{12} The Twelfth Dorsal.
7_1 The First Lumbar.
7_2, 7_3, 7_4, 7_5 The Successive Lumbar Vertebræ upto the Fifth.
8 The Cecum.
9 The Ileo-Cecal Valve.
10 The Ascending Colon.
11 The Hepatic Flexure.
12 The Transverse Colon.
13 The Splenic Flexure.
14 The Descending Colon.
15 The Iliac Colon.
16 The Rectum.
17 The Transverse Processes.

NOTE—

The bold and black **R** and **4** have no bearing on the present scheme of references.

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Position of the Colon and its Contents
during
Vāma Nauli

Fig. LXII

Radiograph VIII

पुस्तकालय
गुरुकुल कांगड़ी

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[...]

POINTS OF STUDY :—

1 — (a) The secum is filled with the barium solution.
(b) Its shadow is darker than the shadow of the right iliac bone and is to be seen clearly against it.
(c) It is hanging as low as the sacrum.

2 — (a) The shadow of the cecum is divided from that of the ascending colon by a white patch.
(b) This represents the ileo-cecal valve which looks to be clear of all contents as it casts no shadow.

3 — (a) The ascending colon is full of barium injection.
(b) Its shadow is broader than that of the cecum. This may be due to the greater diameter of the ascending colon. As this circumstance is, however, unusual, it is preferable to assume that a wave of peristalsis has comparatively narrowed and emptied the cecum.
(c) It rises as far as the lower border of the twelfth dorsal.
(d) The upper end represents the hepatic flexure which, therefore, occupies the level of the twelfth dorsal.

4 — (a) The transverse colon is filled with the opaque liquid.
(b) The angle it makes with the ascending colon is only slightly less than a right angle.
(c) It is lying in an irregular curve between its two extremities.
(d) It crosses the spine in front of the twelfth dorsal.
(e) The lowest part of the curve is on the left side of the spine and hangs as low as the upper border of the second lumbar.
(f) It rises at the other end till it is in level with the tenth dorsal.

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(g) It ends in the splenic flexure which, therefore, is situated nearly two inches above the hepatic.

5 — (a) The descending colon is full of barium.

(b) It makes a loop with the transverse colon, and descends on the right side of the splenic flexure. This is quite unusual in the anatomy of the human large bowel, as ordinarily the colon descends to the lower region of the abdomen on the left side of the splenic flexure.

(c) As it descends it recedes from the spinal column, so that, in the iliac region, its distance is the greatest from the spine.

6 — (a) The iliac colon does not cast uniform shadow, and hence indicates an unequal distribution of the opaque injection.

(b) The concentration of the liquid increases as the colon descends.

7 — (a) Only the upper part of the rectum is seen in the skiagram.

(b) Its deeper shadow indicates greater concentration of the liquid in this part.

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Fig. LVII

Nauli-Madhyama
or
The Central Aspect of Nauli.

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[Ex. 3]

EXPERIMENT III

OBJECTS OF THE EXPERIMENT :—

One of the objects of this experiment was to know the position of the colon during the central aspect of Nauli—Nauli-Madhyama—which is secured by contracting and isolating both the recti of the abdomen and is illustrated in Fig. LVII. Another object was to note the distribution of the opaque liquid over the different parts of the colon as affected by this practice of Nauli-Madhyama. The third object was to compare this distribution with the normal distribution as seen in the last experiment, and thus to learn the effects of Nauli-Madhyama on the colon contents in general.

PREPARATION OF THE SUBJECT :—

The subject was taken up for this experiment five minutes after the last experiment, with his colon still loaded with the enema.

THE EXPERIMENT PROPER :—

Upto now the central aspect of Nauli has been thrice illustrated in this journal. (Vide Figs. X, XI and XXXVII). It will be readily noticed that the positions represented in Figs. X and XXXVII are the same, whereas the position given in Fig. XI is slightly different. Fig. LVII shows the contracted recti on a large scale. As stated in the last experiment, however, the subject was not given any of these positions exactly; but he was made to sit on the edge of the X-Ray couch, with his legs resting on a foot-stool below. Although this is none of the usual positions taken for Nauli, it has been here given to the subject for the convenience of radiography. We can, however, say on the strength of the X-Ray experiments, that findings of this experiment can approximately apply to the usual positions also. For this ex-

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periment the X-Ray tube was arranged behind the back of the subject and the plate was placed in front of his abdomen.

NOTE—

As will be noticed in the points of study, the left rectus became somewhat relaxed while the abdomen was being skiagraphed. This has not, however, appreciably affected the results.

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Fig. LVIII **Radiograph VI**

Position of the Colon and its Contents
during
Nauli-Madhyama.

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[No. 31

REFERENCES TO RADIOGRAPH VI

1 The Right Rectus Abdominis.
2 The Left Rectus Abdominis.
3 The Ascending Colon.
4 The Hepatic Flexure.
5 The Transverse Colon.
6 The Splenic Flexure.
7 The Descending Colon.
8 The Transverse Processes.

NOTE—

The bold and black **R** and **6** have no bearing upon the present scheme of references.

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POINTS OF STUDY :—

1 — The iliac bones are not to be seen in the radiograph because they have been left out.

2 — (a) The cecum and the lowest part of the ascending colon are also cut off.

(b) As is indicated to be a probability by the tapering shadow of the ascending colon skiagraphed, and as has been verified in different screening examinations, the lowest part of the ascending colon and the entire cecum are sparsely filled with the opaque liquid.

3 — (a) The lowest part of the descending colon, the sigmoid and the rectum have been left out of the picture.

(b) What has been stated in 2 — (b) holds good of these parts also.

4 — (a) The upper part of the ascending colon is very much dilated.

(b) The opaque fluid, however, does not cast very dark shadow.

(c) Hence it seems that the dilation is due to intestinal gases.

(d) It is drawn nearer the spinal column as its shadow almost touches the shadow of the transverse process on *its* left.

(e) In Radiograph V, this part of the colon is lying at a greater distance from the spinal column.

5 — (a) The colon looks distended even at the hepatic flexure.

(b) The angle at the hepatic flexure (vide 4 — (b), p. 171) has given place to a round curve.

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[Art. 3]

6 — (a) The transverse colon casts very dark shadows.
(b) The barium appears to be largely accumulated there.
(c) It still maintains its normal curve, (vide 4 — (c), p. 171).
(d) The lowest point of the curve looks to have changed its place, having shifted itself a little spineward.

7 — (a) The splenic flexure casts faint shadows.
(b) Hence it appears to be almost empty.
(c) The loop at the splenic flexure (vide 5 — (b), p. 172), has changed itself into a sharp fold, the descending colon running downwards abruptly.

8 — (a) The descending colon shows only a light dark shadow.
(b) It appears to be sparsely filled with the opaque liquid.

9 — (a) The right rectus abdominis seems to be well contracted.
(b) Because it casts a deep dark shadow.

10 — (a) The left rectus is partially relaxed.
(b) As is shown by the comparatively lighter shadows, fringing the deeper column.

11 — (a) The two recti standing in front of the vertebræ, have completely overshadowed them.
(b) Only two transverse processes are to be seen on the right side of the spine.

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EXPERIMENT IV

OBJECTS OF THE EXPERIMENT :—

One of the objects of this experiment was to know the position of the colon during the right aspect of Nauli — Dakshiṇa Nauli — which is secured by contracting, isolating and rolling to the extreme right, the right rectus abdominis, as illustrated in Fig. XXXVI in the last and Fig. LIX in this issue. Another object was to note the distribution of the opaque liquid over the different parts of the colon as affected by this practice of Dakshiṇa Nauli. The third object was to compare this distribution with the normal distribution, as seen in the second experiment on Nauli, and thus to learn the effects of Dakshiṇa Nauli on the colon contents in general.

PREPARATION OF THE SUBJECT :—

The subject was taken up for this, 10 minutes after the last experiment, with his colon still loaded with the same liquid.

THE EXPERIMENT PROPER :—

The position of the subject and the X-Ray arrangements here, were the same as in the last experiment. Instead of Nauli-Madhyama, at this time the subject practised Dakshiṇa Nauli, as illustrated in Fig. XXXVI in the last and Fig. LIX in this number.

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Fig. LIX

Dakshiṇa Nauli
or
The Right Aspect of Nauli.

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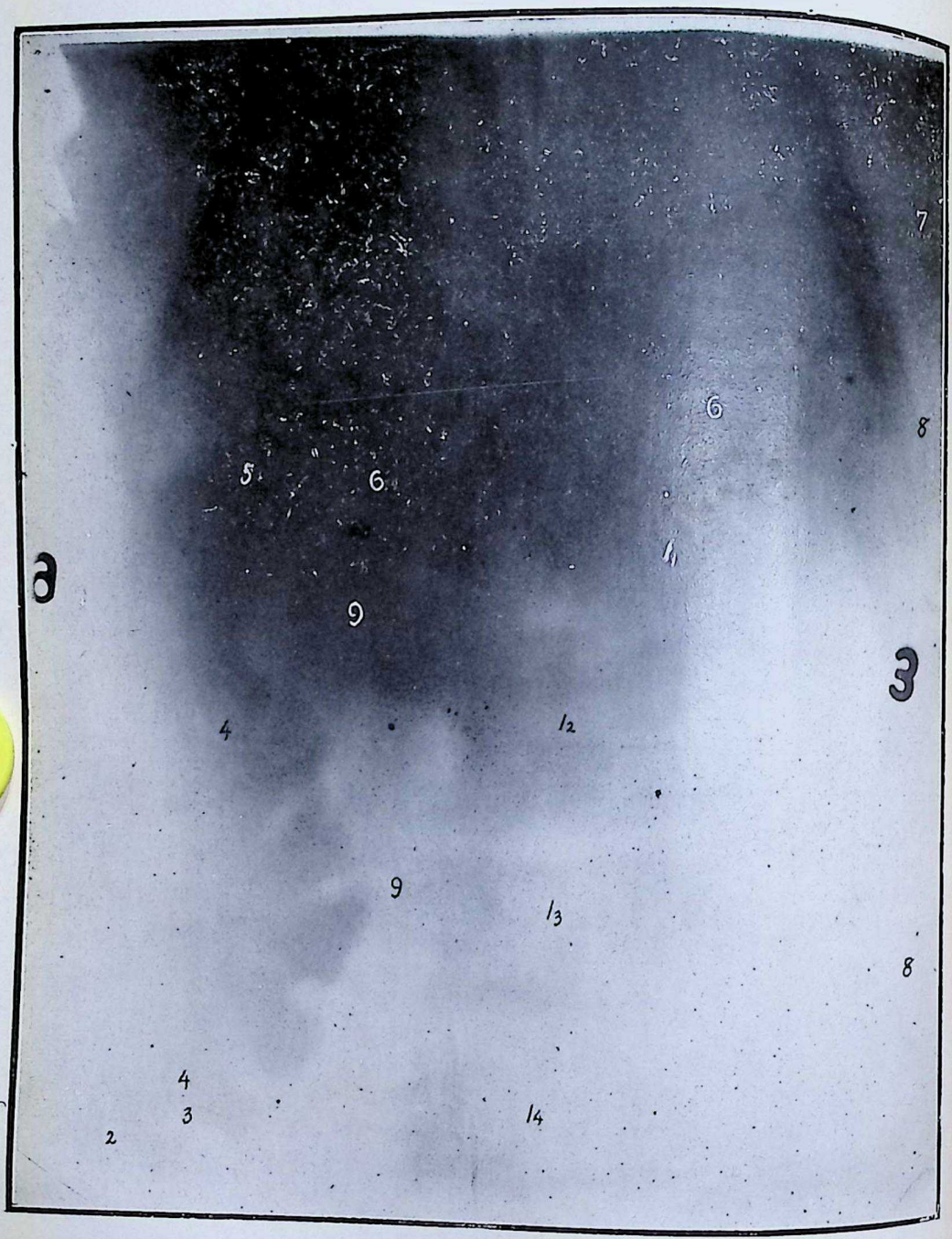
Fig. LX **Radiograph VII**



Position of the Colon and its Contents
during
Dakshiṇa Nauli.

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[3]

REFERENCES TO RADIOGRAPH VII

I_1, I_2, I_3, I_4 The Successive Lumbar Vertebræ upto the Fourth

2 The Cecum.

3 The Ileo-Cecal Valve.

4 The Ascending Colon.

5 The Hepatic Flexure.

6 The Transverse Colon.

7 The Splenic Flexure.

8 The Descending Colon.

9 The Right Rectus Abdominis.

NOTE—

The bold and black **3** and **6** have no bearing on the present scheme of references.

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POINTS OF STUDY :—

1 — (a) The iliac bones do not appear in the picture.
(b) Perhaps the crest of the left iliac bone is slightly visible.

2 — (a) Main portion of the cecum looks to be left out.
(b) A little of the upper portion is included in the radiograph.
(c) It throws a faint shadow.
(d) Therefore it appears to be scantily filled with the opaque liquid.

3 — (a) The ileo cecal valve is represented by a white patch.
(b) Therefore it is clear that no injection has found its way to it.

4 — (a) The ascending colon seems to be greatly dilated.
(b) It does not throw uniformly dark shadows.
(c) It looks, therefore, to be unevenly filled with barium.
(d) The accumulation increases as the colon ascends.
(e) Instead of hanging perpendicular as in Radiograph V, it bends in the middle towards the spinal column.

5 — (a) The angle at the hepatic flexure has given place to a well rounded curve.
(b) The hepatic flexure casts a dark shadow.
(c) It seems to be full of barium.
(d) Instead of standing in level with the twelfth dorsal, as in Radiograph V, it has lowered itself to the first lumbar.

6 — (a) The transverse colon throws very dark shadows.
(b) The injection appears to be largely accumulated there.
(c) The lowering of the hepatic flexure seems to have almost straightened the right half of the transverse colon.

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(d) The left half, however, looks to have retained its original position as shown in Radiograph V.

(e) The lowest point of this colon has shifted itself from the left of the spine (vide Radiograph V), to the front of it.

7 — (a) The splenic flexure has thrown a very dark shadow.
(b) It appears to be full of opaque injection.
(c) Though not to the extent of the hepatic flexure, it looks to be a little lowered down from its place.
(d) The original loop at this flexure, though not clearly printed in this picture, seems to have taken here a sharp downward turn as in Radiograph VI.

8 — (a) The shadow of the descending colon is very faint.
(b) It appears to be very sparsely filled with the opaque solution.
(c) It is hanging almost perpendicular from the splenic flexure.

9 — The sigmoid and the rectum do not appear in the picture.

10 — (a) The shadow between the ascending colon and the spine, is cast by the right rectus abdominis.
(b) Because it is vigorously contracted.
(c) On the left side of the spine there is no corresponding shadow.
(d) Because the left rectus is fully relaxed.

11 — (a) An examination of the white patches between two successive vertebræ, shows that the blanks are narrower on the right and broader on the left.
(b) This is because the spine is bent sideway in order to secure a complete contraction of the rectus.

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EXPERIMENT V

OBJECTS OF THE EXPERIMENT :—

One of the objects of this experiment was to know the position of the colon during the left aspect of Nauli—Vāma Nauli—which is secured by contracting, isolating and rolling to the extreme left, the left rectus abdominis, as illustrated in Fig. XXXVIII in the last and Fig. LXI in this issue. Another object was to note the distribution of the opaque liquid over the different parts of the colon as affected by this practice of Vāma Nauli. The third object was to compare this distribution with the normal distribution as seen in the second experiment on Nauli, and thus to learn the effects of Vāma Nauli on the colon contents in general.

PREPARATION OF THE SUBJECT :—

The subject was taken up for this, 15 minutes after the last experiment, with his colon still loaded with the same liquid.

THE EXPERIMENT PROPER :—

The position of the subject and the X-Ray arrangements here, were the same as in the last two experiments. Instead of either Nauli-Madhyama or Dakshiṇa Nauli, the subject practised Vāma Nauli, as illustrated in Fig. XXXVIII in the last and Fig. LXI in this issue.

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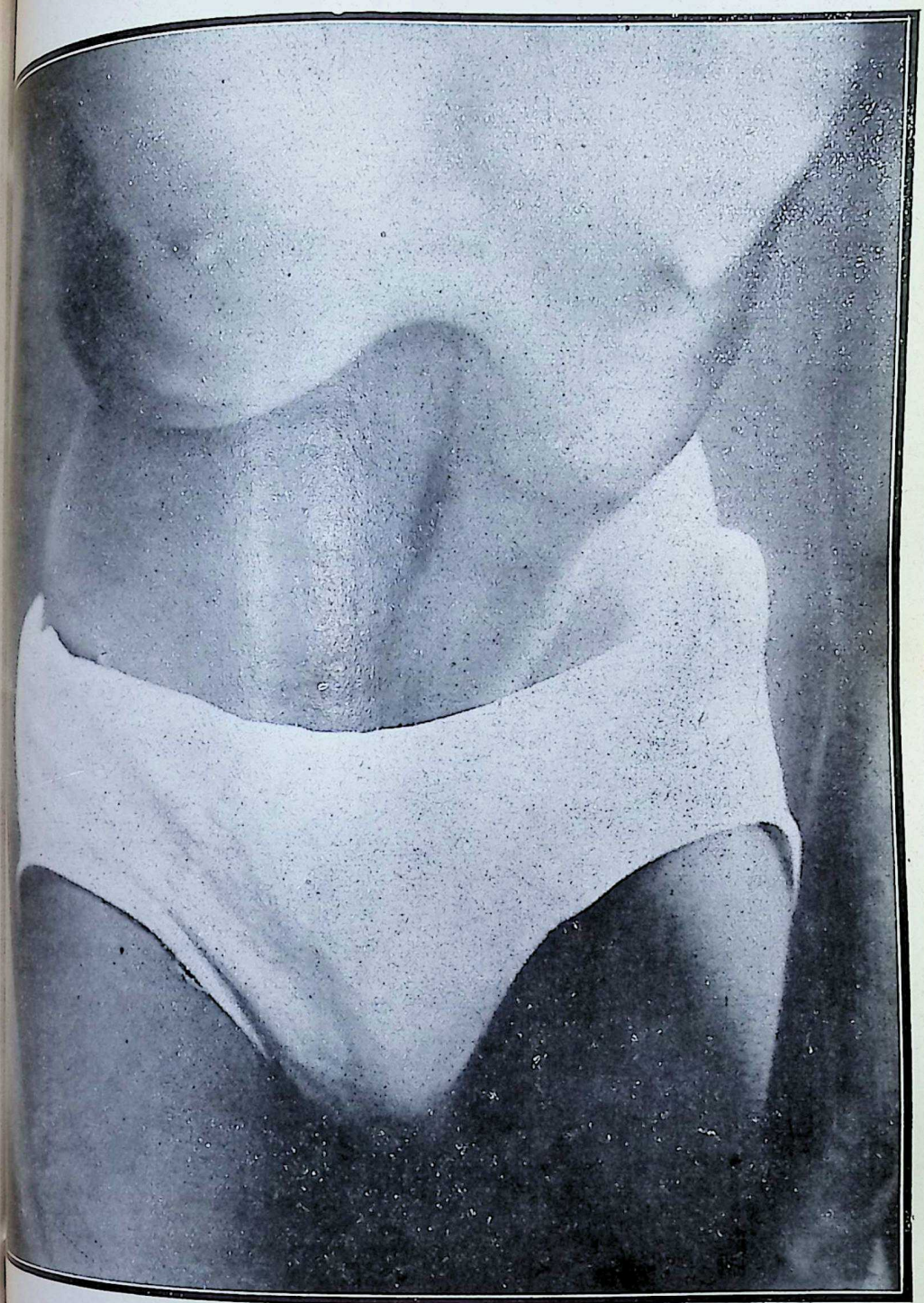
Fig. LXI



Vâma Nauli
or
The Left Aspect of Nauli.

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Fig. LXII **Radiograph VIII**

Position of the Colon and its Contents
during
Vâma Nauli

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[No. 3]

REFERENCES TO RADIOGRAPH VIII

I_1, I_2, I_3, I_4 The Successive Lumbar Vertebræ upto the Fourth.
2 The Ascending Colon.
3 The Hepatic Flexure.
4 The Transverse Colon.
5 The Splenic Flexure.
6 The Descending Colon.
7 The Left Rectus Abdominis.

NOTE—

The bold and black **3** and **5** have no bearing on the present scheme of references.

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POINTS OF STUDY :—

1 — (a) The iliac bones do not appear clearly printed in the picture.

(b) Perhaps the faint shadows on the two sides of the spine between it and the two colons, represent these bones.

2 — (a) The cecum does not appear in this radiograph.

(b) We cannot, therefore, know whether in the present case it is full or empty.

(c) Looking to the usual results of this exercise the cecum should be slightly filled with barium.

(d) As will be presently noticed, however, the lowest part of the ascending colon which is adjacent to the cecum, is heavily loaded with the injection, and suggests that the same may be the case with the cecum.

3 — (a) The shadow of the ascending colon is only fringed with a black border, except at the bottom which is deep dark. Otherwise it is faint.

(b) Hence it looks that the ascending colon is almost empty.

(c) Only the lowest portion of it is loaded.

(d) It is hanging perpendicular from the hepatic flexure.

4 — (a) The hepatic flexure throws a light dark shadow.

(b) Therefore it looks to be lightly loaded with the opaque liquid.

(c) At it, the colon neither takes as round a curve as in Radiographs VI and VII, nor makes an angle as straight as in Radiograph V ; but prefers an intermediate position.

(d) The hepatic flexure lies neither in level with the twelfth dorsal as in Radiograph V, nor in level with the first lumbar as in Radiograph VII, but chooses a middling location.

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5 — (a) The transverse colon casts a deep dark shadow.
(b) It looks to be as heavily loaded here as in Radiographs VI and VII.
(c) But the lowest point of its curve which was opposite the spine in Radiograph VI and which lay a little to its left in Radiograph VII, now lies further off in this case.

6 — (a) The splenic flexure throws a very dark shadow.
(b) Therefore it looks to be full of the opaque liquid.
(c) Though it is not clearly visible against the dark background, it can be marked that its level above the hepatic flexure is not as high here as in Radiograph VII.

7 — (a) The descending colon does not throw uniform shadows, the upper and lower portions are dark whereas the middle portion is faint.
(b) Therefore it appears that its upper and lower parts are loaded with barium, but there is a slight accumulation in the middle.
(c) It does not hang perpendicular, but is drawn nearer the spine as it descends.

8 — (a) The sigmoid and the rectum are left out in the picture.
(b) Perhaps the deep dark spot between the spine and the descending colon, represents a part of the sigmoid, and indicates a heavy accumulation there.

9 — (a) The column of shadow standing between the lumbar vertebræ and the descending colon, represents the left rectus abdominis.
(b) This muscle seems to be vigorously contracted.

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No.	Parts of the Colon	NORMAL	
		Radiograph I	*Radiograph V*
1	The Cecum	Opposite Lumbar V	Below Lumbar V
2	The Ascending Colon ...	Approaching the spine as it ascends	Almost Perpendicular
3	The Hepatic Flexure ...	Opposite Lower border of Lumbar I	Opposite Dorsal XII
4	The Angle at the Hepatic Flexure	Extremely acute	Almost a Right Angle
5	The Transverse Colon ...	Folding itself double	Making a concave curve in the abdomen
6	The Lower Point of the Transverse Colon	Opposite Upper border of Lumbar V	Opposite Upper border of Lumbar II
7	The Splenic Flexure ...	Opposite Upper border of Lumbar I	Opposite Dorsal X
8	The Curve or Loop at the Splenic Flexure	A narrow curve on the left	A big loop on the right
9	The Descending Colon ...	Perpendicular	Receding from the spine as it descends

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ING NAULI AT A GLANCE

UDDIYĀNA *Radiograph II*	NAULI-MADHYAMA *Radiograph VI*	DAKSHINA NAULI *Radiograph VII*	VĀMA NAULI *Radiograph VIII*
Probably considerably raised	?	Opposite Lumbar IV	?
Probably deviating to the spine	Upper half perpendicular	Taking a curve approaching the spine	Perpendicular
Opposite Dorsal XII	?	Opposite Lumbar I	Opposite Dorsal XII and Lumbar I
Changed to a round curve	Changed to a round curve	A curve tending to form an angle	A curve almost forming an angle
Making a convex curve in the abdomen	Making a convex curve in the abdomen	Making a convex curve in the abdomen	Making a convex curve in the abdomen
Opposite Dorsal XI	?	Opposite Lumbar I	Opposite Upper border of Lumbar II
Opposite Dorsal XII	?	Opposite Dorsal XI	Opposite Dorsal XII
A wide curve on the left	A narrow loop on the right	A narrow loop on the right	A narrow loop on the right
Deviating to the spine as it descends	Almost perpendicular	Almost perpendicular	Deviating to the spine as it descends

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DISTRIBUTION OF COLON CONTENTS

No.	Parts of the Colon	NORMAL	
		Radiograph I	*Radiograph V*
1	The Cecum	Filled	Filled
2	The Lower Ascending Colon ...	Filled	Filled
3	The Upper Ascending Colon ...	Filled	Filled
4	The Hepatic Flexure ...	Filled	Filled
5	The Transverse Colon ...	Filled	Filled
6	The Splenic Flexure ...	Filled	Filled
7	The Upper Descending Colon ...	Sparsely filled	Filled
8	The Lower Descending Colon ...	Sparsely filled	Filled
9	The Sigmoid	Filled	Filled
10	The Rectum	Filled	Filled

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DURING NAULI AT A GLANCE

UDDIYĀNA *Radiograph II*	NAULI-MADHYAMA *Radiograph VI*	DAKSHINA NAULI *Radiograph VII*	VĀMA NAULI *Radiograph VIII*
Empty	Probably sparsely filled	Probably sparsely filled	Probably sparsely filled
Empty	Sparsely filled	Filled	Partly filled
Half empty	Sparsely filled	Filled	Almost empty
Filled	Filled	Filled	Filled
Filled	Filled	Filled	Filled
Filled	Filled	Filled	Filled
Sparsely filled	Sparsely filled	Sparsely filled	Filled
Sparsely filled	Filled	Sparsely filled	Filled
Filled	Filled ?	Sparsely filled	Filled
Filled	Filled ?	Sparsely filled	Filled ?

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SEVEN X-RAY EXPERIMENTS SUMMED UP

UPTO now seven X-Ray experiments bearing on Nauli have been published in this journal; and though much more experimental work remains yet to be done in this connection, we are now in a position to sum up the results of what we have already observed. These seven experiments include two on Uḍḍiyāna. These have been considered here, because Uḍḍiyāna forms an integral part of Nauli, although it can also be practised independently.

First taking into account the position of the different parts of the colon, we find that the exercise of Nauli moves every part of the large bowel that enjoys mobility as a natural course of things. Starting with the *cecum* we see that it is considerably raised from its original position. (Radiographs II and VII). The *ascending colon* is somewhat raised and thrown into a curve approaching the spine. (Radiographs II and VII). The *hepatic flexure* is raised (Radiograph II); and lowered. (Radiographs VII and VIII). At this flexure the colon, if it originally makes an angle (Radiographs I and V), can be made to throw itself into a round curve (Radiographs II and VI); or it can be made to assume a position midway between an angle and a curve. (Radiographs VII and VIII). The *transverse colon* can be thrown up into a concave curve circling round the eleventh dorsal, (Radiograph II); and even when it maintains a convex curve, its lowest point can be shifted from place to place. (Radiographs VI, VII and VIII). The *splenic flexure* can be raised (Radiograph II), or lowered. (Radiographs VII and VIII). If at this point the colon forms an angle (Radiograph I), the angle can be effaced (Radiograph II); and if it forms a loop (Radiograph V), the loop can be narrowed (Radiographs VI, VII and VIII); or it can be even obliterated.[1] The *descending colon* can be attracted to the spine (Radiographs II and VIII), if it hangs perpendicular (Radiograph I),

1 We have got radiographic evidence for this statement and hope to publish it on some other occasion.

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nay, even if it is originally receding from the spine. (Radiograph V).

An examination of the colon contents reveals the fact that, *nearly* every part of the colon can be filled or emptied by this practice. We use the word *nearly* because we have no radiographic evidence to show that the sigmoid can be similarly treated. As stated on p. 24 in the first number of this volume, however, we have seen even this part of the colon emptied during Uḍḍiyāna.

Starting with the *cecum*, we see that it can be entirely unloaded. (Radiograph II). The *lower ascending colon* can be partially emptied (Radiograph VII); or it can be kept entirely free. (Radiograph II). The upper half of the *ascending colon* can also be almost emptied. (Radiograph VIII). The upper part of the *descending colon* can be partially disburdened (Radiographs II, VI and VII); whereas the lower part of it can either be partially unloaded (Radiographs II and VII); or it can be completely emptied as stated on p. 24 in the first number.

The fact that the *transverse colon* and the two flexures on its sides never appear empty, need not lead us to the conclusion that their contents do not move. In Radiograph VII, the liquid in the right half of the transverse colon looks to be driven to the ascending colon, its place being taken by the liquid in the left half, the contents of the descending colon rising to occupy the emptied left part of that colon. In Radiograph VIII, the reverse is the case, the liquid being pushed in the opposite direction.

Regarding the *lumbar spine* we find that it gets a lateral pull. (Radiographs VII and VIII). It also experiences an upward pull (Radiograph II); and a downward push. (Radiograph IV).

The contracted recti can be observed, the left in Radiograph VIII and the right in Radiograph VII.

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N. B. — Readers will do well to digest the two charts given at the end of the Scientific Section and also the subsequent summing up of the seven X-Ray experiments before reading the Semi-Scientific Section.

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The Semi-Scientific Section

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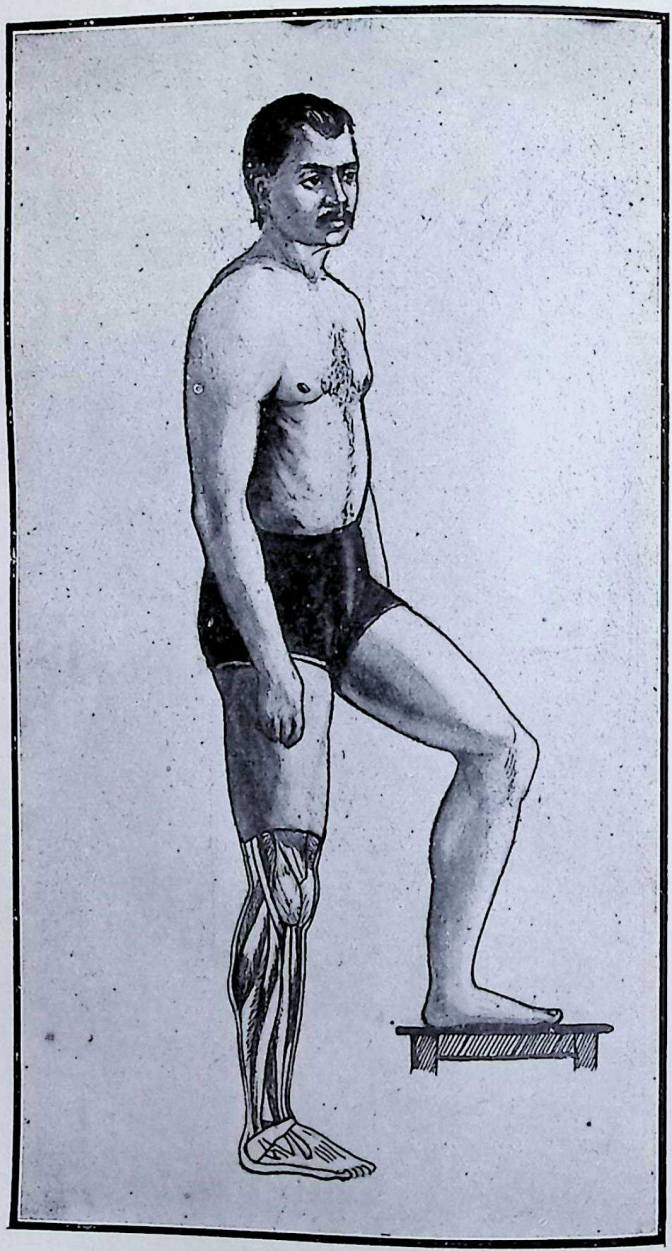
Fig. LXIII



Muscles of the Right Leg.

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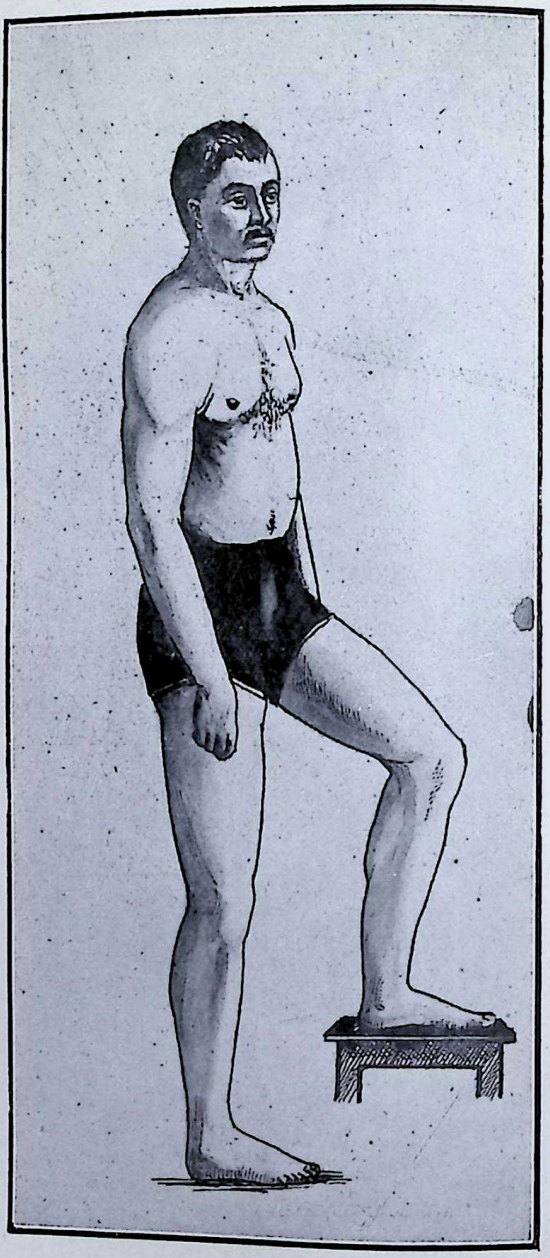
Fig. LXIV



The Right Leg.

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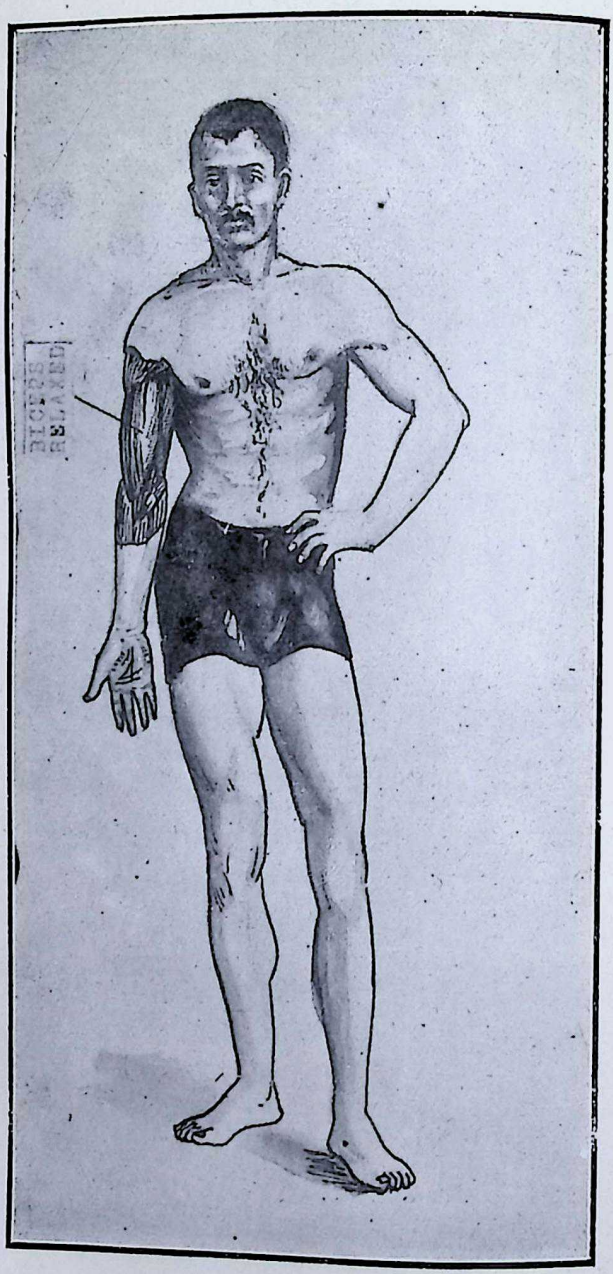
Fig. LXV



Biceps Relaxed.

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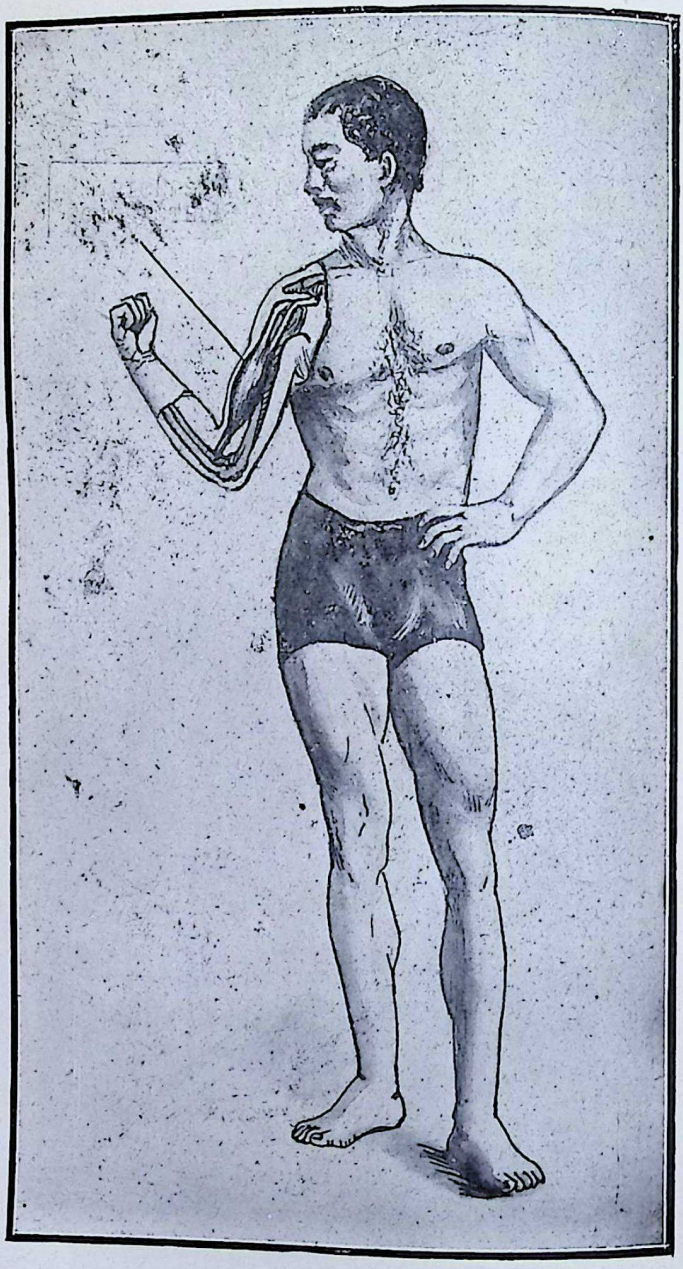
Fig. LXVI



Biceps Contracted.

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MUSCLE[1]

MUSCLE is popularly known as flesh. This flesh does not cover the bones in a solid layer; but is composed of many separate muscles, about five hundred in number, if the whole body is taken into account. Fig. LXIII shows the muscles of the right leg covering the bones underneath. But these muscles themselves are, in the human body, covered by the fat and skin, and give a round appearance to the different limbs. Fig. LXIV represents the same right leg with the fat and skin on.

Each muscle is made up of small, elongated, thread-like structures called *muscular fibres*. When a muscle is working these fibres contract, become thicker and shorter, and thus thicken and shorten the whole muscle. In Fig. LXV the muscle called *biceps* is at rest, and is said to be in a relaxed condition. But in Fig. LXVI the same muscle is working. It has bent the forearm in the elbow-joint and folded it upon the arm. This the muscle could do by contracting itself and becoming shorter thereby. The contraction can be seen from the thick bundles of its fibres in the middle of the arm.

Every movement of our body requires particular muscles to contract. When I wish to bend my finger, the impulse starts in the brain and travels down the nerve which supplies the muscles of that particular finger. These muscles contract and become shorter, on account of the nervous impulse they receive; and thus raise that finger. This means that I can contract the finger-muscles by my will. But there are some muscles which, no doubt, contract under the nervous impulse; but we cannot send that impulse to those muscles at our will, and thus control their contraction. Those, that we can work by our will, are called *voluntary* muscles, the remaining

[1] This and the subsequent note have been summarized from W. D. Halliburton's *Handbook of Physiology*.

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being called *involuntary*. In both the cases the impulse comes from the central nervous system. There appear, however, to be exceptions to this rule, and the involuntary muscle may execute its contractions independently of nervous control; that is to say, it is some times, in the truest sense of the term, really involuntary. This is very markedly seen in the developing heart of the embryo, which begins to beat before any nerve-fibres have grown into it from the central nervous system. Involuntary muscles form part of the walls of the stomach and intestines, arteries and veins, bladder and kidneys, etc. Voluntary muscles are spread all over the skeleton.

Involuntary muscles differ from voluntary muscles inasmuch as the latter are marked by alternate dark and light stripings or striations, whereas the former are not. For this reason involuntary muscles are called striped or striated and voluntary ones plain or smooth. There is one important exception to this rule, namely, in the case of the heart, the muscular fibres of which are involuntary, but transversely striated. Another characteristic of involuntary muscles is a tendency to regular alternate periods of rest and activity, or rhythmicality. This is best exemplified in the case of the heart which contracts and dilates more than sixty times a minute.

A third characteristic of involuntary muscles is *peristalsis*. If any point of a tube of smooth muscle, such as the small intestine, is stimulated, a ring-like constriction is produced at this point. After lasting sometime at this spot it slowly passes along the tube at the rate of 20 to 30 millimetres per minute. This advancing peristaltic wave normally takes place in only one direction, and so serves to drive on the contents of the tube.

Involuntary muscle is usually supplied with two sets of nerves, one of which (accelerator[1]) increases and the other (inhibitory[1]) decreases its activity.

1 Vide our note on Physiology of Nerve.

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PHYSIOLOGY OF NERVE[1]

CLASSIFICATION OF NERVES

THE nerve-fibres which form the conducting portions of the nervous system may be classified into three main groups, according to the direction in which they normally conduct nerve impulses. These three classes are :—

1. Efferent nerve-fibres.
2. Afferent nerve-fibres.
3. Inter-central nerve-fibres.

1. *Efferent* nerves are those which conduct impulses from the central nervous system (brain and spinal cord) to other parts of the body. When, for instance, there is a wish to move the hand, the impulse starts in the brain, and travels a certain distance down the spinal cord ; it leaves the spinal cord by one or more of the spinal nerves, and so reaches the muscles of the hand, which are thrown into contraction.

A list of the classes of efferent nerves is as follows :—

(*a*) Motor. (*b*) Accelerator. (*c*) Inhibitory. (*d*) Secretory. (*e*) Trophic.

(*a*)—Motor nerves—some of these go to voluntary muscles ; others to involuntary muscles, such as the nerves which supply the muscular tissue in the walls of arteries.

(*b*)—Accelerator nerves are those which produce an increase in the rate of rhythmical action. The contraction and relaxation of the heart normally takes place at a regular interval. That is its action is rhythmical.

(*c*)—Inhibitory nerves are those which cause a slowing in the rate of rhythmical action, or it may be its complete

1 Before studying this, the readers should digest the note given on p. 51 of the current volume.

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cessation. Inhibitory nerves are found supplying many kinds of involuntary muscle; a very typical instance is found in the inhibitory fibres of the heart which are contained within the tenth cranial nerve, the vagus.

(*d*)—Secretory nerves are found supplying many secreting glands such as the salivary glands, gastric glands, and sweat glands. The impulse which travels down a secretory nerve stimulates secretion in the gland it supplies.

(*e*)—Trophic nerves are those which control the nutrition of the part they supply.

2. *Afferent* nerves are those which conduct impulses in the reverse direction, namely, from all parts of the body to the central nervous system. When one feels pain in the finger, the nerves of the finger are stimulated, an impulse travels up the nerves to the spinal cord, and then to the brain. The mental process set up in the brain is called a *sensation*. The sensation, however, is referred to the end of the nerve where the impulse started, and the sensation of pain does not appear to occur in the brain, but in the finger. This is an instance of a sensory nerve; and the terms afferent and sensory may often be used synonymously.

The excitation of many afferent nerves will excite what are called *reflex actions*. We are very often conscious of the sensations that form the cause of a reflex action, but we do not necessarily have such sensations. Many reflex actions, for instance, occur during sleep; many may be executed by the spinal cord even after it has been severed from the brain, and so the brain cannot be aware of what is occurring.

A reflex action is an action which is the result of an afferent impulse. Thus a speck of dust falls into the eye, and causes movements of the eyelids to get rid of the offending object. The dust excites the sensory nerve-endings, an impulse travels to the centre of this nerve in the brain,

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and from the brain a reflected impulse travels to the muscles of the eyelids throwing them into contractions. As an instance of a reflex action in which secretion is concerned, take the watering of the mouth which occurs when food is seen or smelt. The nerves of sight or smell convey an afferent impulse to the brain, which reflects, down the secretory nerves, an impulse which excites the salivary glands to activity.

These, however, are instances of reflex action which are accompanied with conscious sensation, but like all pure reflex actions, are not under the control of the will.

An instance of a reflex action not accompanied with consciousness, is seen in a man with his spinal cord cut across or crushed, so that any communication between his brain and his legs is impossible. He cannot move his legs voluntarily, and is unconscious of any feelings in them. Yet when the soles of his feet are tickled he draws his legs up, the centre of reflex action being in the lower region of the spinal cord.

For a reflex action, three things are necessary : (1) an afferent nerve, (2) a nerve-centre consisting of nerve-cells to receive the afferent impulse and send out the efferent impulse, and (3) an efferent nerve along which the efferent impulse may travel.

3. *Inter-central* nerve-fibres are those which connect nerve-centres together ; they connect different parts of brain, and of the cord to one another.

SECTION, STIMULATION, DEGENERATION AND REGENERATION OF A NERVE

Section :—

This consists in cutting the nerve and observing the loss of function that ensues. Thus, if a motor nerve is cut, motion of the muscles it supplies can no longer be produced by activity of the nerve-centre ; the muscle is paralysed. If a sensory nerve is cut, the result is loss of sensation in the part it comes from.

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Stimulation :—

This is the opposite experiment. When a nerve is cut across, one piece of it is still connected with the brain or spinal cord; this is called the *central end*; the other piece, called the *peripheral end*, is still connected with some peripheral part of the body. Both the central and the peripheral end should be stimulated; this is usually done by means of electricity. In a motor nerve, stimulation of the central end produces no result; stimulation of the peripheral end produces nervous impulse which excites the muscles to contract. In a censory nerve, stimulation of the peripheral end has no result, but stimulation of the central end causes a sensation, usually a painful one, and also reflex actions, which are the result of the sensation.

Degeneration :—

Suppose a nerve is cut right across, the piece of the nerve left in connection with the brain or spinal cord remains approximately healthy in both structure and function; but the peripheral piece of the nerve loses its functions and undergoes disintegration in its structure. This change in the peripheral piece is called *degeneration*. This process of degeneration may take place on account of mechanical or chemical actions in the body without the nerves being actually cut to pieces.

Regeneration :—

When a degenerated nerve is restored to its original function and structure, it is said to be regenerated. The process of regeneration may be due to nature, or nature helped surgically or otherwise.

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CECAL CONSTIPATION

PART II

(Continued)

In the last issue we have noticed the first of the two causes of constipation, and have also seen how it can be best removed by the Yogic exercises. In this number we propose to treat the second cause : the degeneration or absence of the normal nervous and muscular control of the colon wall. But before we discuss the nervous and muscular control of the colon, it is necessary to say something about the position of the colon as a whole in the abdominal cavity.

It has been stated on pp. 117–118 of the last number that, the stomach and the bowels have a tendency to be displaced downwards on account of the weakness of abdominal muscles. Nearly every man suffering from chronic constipation also suffers from the displacement of the abdominal viscera. When the abdominal muscles get their proper tone, these viscera will, indeed, be replaced in their proper position. But are we till then to wait and allow the viscera to have their own course, or are their exercises which while strengthening the abdominal wall, will, side by side, help these organs to be replaced?

The practices of Uḍḍiyāna and Nauli are so well adapted to combat chronic constipation, that they serve as the best replacing exercises also. In order to understand the efficacy of the Yogic exercises, we will first summarize what the Western physical culturists require their patients to do under these circumstances. They say—

"Place the hands upon the lower abdomen and breathe deeply; with each expiration press hard upon the little finger-side of the hands and draw the hand upward so as to push

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the contents of the abdomen toward the diaphragm. Hold the hands firmly in position during the inspiration."

The aim of this exercise is slowly to push upwards the different organs in the abdominal cavity that may have been displaced downwards. Now we have seen, with the help of the X-Rays, what Uḍḍiyāna can do in this respect. It can raise the cecum and the ascending colon and can push up to a very considerable height the transverse colon. The two flexures on the two sides of the transverse colon, can also be moved up, nay, in fact the whole peritoneal wall can be raised within the abdomen. The degree of pressure to be applied to the internal viscera, can be adjusted at our will, because everything depends upon the manipulations of muscles which we can control at every step. In Uḍḍiyāna we get only the upward movement. The practice of Nauli affords lateral movements also. We have seen in 'Seven X-Ray Experiments Summed Up' in the Scientific Section, that the ascending and descending colons are drawn towards the spine during the exercise of Nauli. A minute study of the radiographs published upto now, will clearly point out that the fate of these two colons is shared nearly by all the abdominal viscera during the exercises of Uḍḍiyāna and Nauli. Thus in correcting the displacements of the bowels etc., Yogic exercises will be found to be very useful.

But at times it so happens that patients are not able to pick up Uḍḍiyāna easily. Some people accumulate so much fat in the abdominal wall that they lose all control over their muscles. Others are too weak in health to undergo the strain which Uḍḍiyāna and Nauli require. What are those people to do?

For these the practice of Sīrshāsana is the best. Care must be taken in practising the Āsana as has been directed in the last issue. We have seen a number of constipated people feeling better for this exercise. One of the ways in which Sīrshāsana helps to cure constipation, is that it can replace the pro-

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lapsed organs of the abdomen. The inverted position of the abdominal cavity tends to push the abdominal contents towards the diaphragm, and thus gives them an opportunity to be free from the downward pull of gravity and to be replaced in their original positions.

Exercises to strengthen the abdominal wall should start only when the prolapsed viscera have been replaced by proper practices. If this is not done, the effect may be to increase the displacement whenever the abdominal muscles are strongly contracted. The Yogic physical culturists seem to have understood this principle so well that, they do not allow the practice of Nauli unless the practice of Uḍḍiyāna is continued for a long time. The very way to Nauli lies through Uḍḍiyāna. So it is never possible for a Yogic physical culturist to recommend the practice of contracting exercises[1] before the replacing exercises are undergone. For those who are not able to pick up Uḍḍiyāna and Nauli but have to depend upon the Āsanas for a cure, it is desirable to practice S'īrshāsana before practising the other poses. While the posture lasts it is necessary to breathe out completely and to press in the abdominal wall, so that additional pressure may be put upon the viscera already moving towards the diaphragm. The exhalation may be repeated three to seven times according to strength.

But there are people who can neither practise Uḍḍiyāna or Nauli nor can practise S'īrshāsana. Various limitations to this pose have been laid down in the last issue. There is another drawback. Some people have little moisture in their systems. Due to constipation fecal matter lingers so long in their colons that it is reduced to very dry and hard balls. They never pass liquid or semi-liquid stools. Such people suffer for the practice of S'īrshāsana. Muscular energy spent in S'īrshāsana, increases the absorbing activity of the colon; and what little moisture there be in the fæces, is also removed from them.

1 Exercises which strengthen the abdominal muscles by their alternate contraction and relaxation.

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Thus they get harder and harder, and if the rectum continues to be loaded with them for a number of hours, that sets up headache. Under such circumstances the Āsana makes the patient worse.

These people should substitute the exercise of Yoga-Mudrā for S'īrshāsana. It is described at length in the Popular Section of this issue. Care must be taken to select that variety of it which has been suggested as a replacing exercise.

While discussing the question of displacement, we wish to point out one more fact regarding the colon. There is such a variety in the normal position of the large bowel in different individuals that, positions which would ordinarily look pathological in some cases, are quite normal in others. Take for example the transverse colon skiagraphed in Fig. VIII in the first issue. It hangs as low as the fifth lumbar, which is quite abnormal. And yet we have observed the young man to have not a trace of bowel complaint. Even when circumstances made it physically impossible for him to undergo any exercises, he maintained full bowel activity; and had no complaint of constipation, unless extraneous circumstances came in the way. The loop at the splenic flexure to be seen in Fig. LVI in this issue, is another seeming abnormality. We have been watching this individual from day to day and month to month, and yet we have failed to mark any irregularity of bowels in his case. The whole alimentary canal is working with great efficiency and the health of the individual is thoroughly satisfactory.

When these anomalies are coupled with constipation, they are looked upon as the cause of it, and the real cause is lost sight of. A surgical operation is undertaken to remove the apparent cause; but the operation does not help the patient, the anomaly not being pathological and the real cause being left intact. Under such circumstances surgeons would do well not to depend too much upon seeming abnormalities of the colon.

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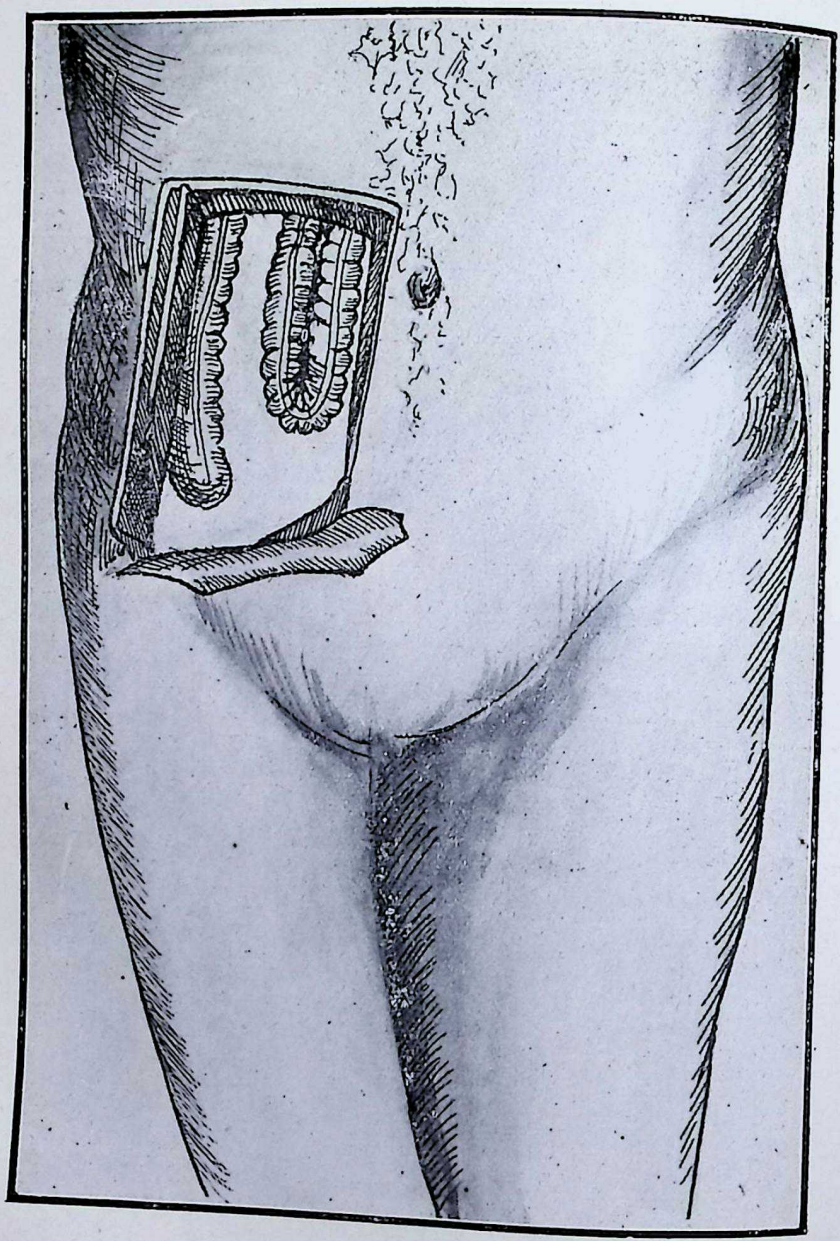
Fig. LXVII



A Kink in the Transverse Colon.

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Fig. LXVIII

Adhesions in the Pelvic Loop.

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Again, before we discuss the nervous and muscular control of the colon wall, we wish to say a few words about the adhesions and kinking of the colon.

We have seen on p. 112 in the last issue that the intestines are held in a sack called peritoneum, the sack itself being contained in the abdominal cavity. Within the peritoneum the bowels enjoy considerable degree of mobility which is essential for their proper functioning. Due to some inflammation arising from various causes, either in some portion of the intestines or of the peritoneum, the affected parts have a tendency to stick to whatever might be in the neighbourhood. In this way the colon may stick to the peritoneum and the peritoneum to the abdominal wall and form what are called *adhesions*. Fig. LXVIII represents such adhesions in the pelvic loop. The physiology of these adhesions is yet in the making. Still one thing is quite clear. Many of these bands of adhesion are entirely harmless and cause no obstruction. Some of them, however, narrow the colon passage and lead to intestinal obstruction. When these adhesions are developed between two adjacent portions of the colon, a sharp angle is formed which is called a *kink*. A kink in the transverse colon has been shown in Fig. LXVII. Very often these kinks also are simply innocent and lead to no trouble. But just as there are some serious adhesions so there are some serious kinks also.

When these serious adhesions and kinks are well established, operative measures look to be the only remedy. But such cases are very rare. Ordinarily the prevention and cure of these adhesions and kinks can be best obtained by means of strict dietary and proper exercise.

The usual vegetarian diet of the Hindus would quite suit the purpose. All animal protein and every irritant should be avoided.

Exercises in this connection should be such as would bring into play the full mobility of the intestines, and also move

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the peritoneum through the agency of the muscles that are in contact with it.

Now, it has been shown that nearly every part of the colon can be moved by the exercise of Nauli and Uḍḍiyāna. S'īrshāsana also is a very good pose in this respect. The sigmoid is supposed to be a part where the danger of adhesions and kinks being formed, is very great. The folds of the sigmoid can best be moved by means of the Topsyturvy Pose. The upside-down position of the intestines throws their burden upon the diaphragm and relieves the sigmoid which might hang from the rectum. That the folds of the sigmoid are effaced in this pose, can be easily known by the rush of the colon gases to the rectum immediately after one stands on the head. The practices of Uḍḍiyāna and Nauli can not only move the different parts of the bowels, but they can also move the peritoneum. As has been already stated on p. 112 of the current volume, the peritoneum stretches itself along the inner side of the abdominal wall. When the muscles forming this wall are moved, the peritoneum also moves through them. Now, Uḍḍiyāna and Nauli have been shown to exercise every abdominal muscle; and as such they are—the best exercises also for the peritoneum. It has already been proved that the whole peritoneal wall can be raised in Uḍḍiyāna.

In almost all the cases of adhesions and kinks non-operative treatment is useful and an operation is rarely indicated. But let a Western medical man[1] speak:—

"So much is being said about 'kinks' in current medical literature it is not remarkable that the laity should begin to take an interest in the subject. The writer's chief purpose in mentioning this subject here is to emphasize the fact that 'kinks' are of far less consequence than was at first supposed. X-Ray evidence has demonstrated that kinks and folds in the colon are seriously obstructive only in very rare cases. To

1 J. H. Kellogg in *Colon Hygiene*.

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[No. 3]

advise a surgical operation simply because the X-Ray shows a 'kink' or fold in the transverse colon or a very pronounced prolapse, is most improper. It has been proved that the so called 'Lane's kink[1]' of the terminal ileum is seldom a source of trouble and very rarely requires surgical interference. By the adoption of an atoxic diet from which all animal protein is excluded and by the employment of the necessary measures for securing three[2] bowel movements daily the troubles supposed to arise from 'kinks' rarely fail to disappear; and without the adoption of these measures surgery affords only temporary relief, sometimes not even that, as a return for the very great risk to life and the severe suffering and shock involved in such operations as 'short circuiting' and removal of the colon."

Having discussed displacement and kinking of the colon, we now proceed to examine the degeneration or absence of the normal nervous control of the colon wall.

In order to understand this disorder and its cure, it is necessary to know the nervous supply of the colon, the way in which it controls the colon wall and the agencies that lead to the weakening of this control.

The nervous[3] supply of the large bowel is derived both from the central nervous system as well as from the sympathetic. The central system works through the second, third and fourth sacral nerves, and is excitatory to both the coats of the muscular wall; whereas the sympathetic works through the pelvic plexuses and is inhibitory especially to the internal anal sphincter. These two sets of nerves (central and sympathetic), send their fine fibres between the two muscular layers of the colon wall and form what is called the *plexus of Auerbach.*

1 This consists in a fixation of the ordinarily mobile portion of the ileum, just before it reaches the cecum, by a band of adhesion. It is named after its discoverer Mr. Lane, an eminent surgeon of London.

2 One movement is quite sufficient if it brings about complete evacuation.

3 Readers should preface the reading of this portion by studying the two notes, one on p. 51 in the first and the other on p. 197 in this issue.

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पुस्तकालय
गुरुकुल काँगड़ी

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These are the nerves that control the colon wall, and enable it to push forward its contents and present them to the rectum for defecation.

As noted on p. 39, in the first issue, the intestines push forth their contents by means of the peristaltic action. Now, this action is under the influence of the central nervous system as well as the sympathetic, though the colon movements do not enter into our consciousness. The effect of the central and sympathetic systems upon the intestinal peristalsis is so great that fear, extreme nervousness, or fright of any kind leads to immediate diarrhœa,[1] in some individuals.

Though this is the extent to which the colon wall is controlled by these nervous systems, there is a third influence which is *normally* far more responsible than these systems for the work of the large bowel. That is the influence of Auerbach's plexus. Though this plexus is a development of the two principal nervous systems, it has great independence of action; and the intestinal movements continue under its influence even when all the other nerves are cut off. On the contrary the bowel movements entirely cease, if the influence of this plexus is removed, in spite of the fact that the central and sympathetic nervous mechanism is left intact.

True peristaltic waves are set up in the following manner: The colon contents stimulate either chemically[2] or mechanically the nerve fibres in the bowel wall and set up nervous impulses. These impulses travel to centres situated in Auerbach's plexus, and are thence reflected to the colon muscles which consequently contract and start the peristaltic waves. Thus it will be seen that the peristalsis is simply a series of reflex actions depending upon the soundness of Auerbach's plexus.

1 This form of diarrhœa was so common, as the result of air raids in London during the war, that it used to be called *air raid diarrhœa*.

2 By the chemical action of the acids etc. of the food stuff.

3 By the mere presence of food material.

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What is true of the onward march of food through the colon, is also true of the act of defecation. In both the cases reflex actions are mainly responsible for the function.

Thus takes place defecation: When the bowels are sufficiently loaded for a discharge, the pelvic loop contracts and forces some of its contents into the rectum. This distends the rectal tube and stimulates the nerve fibres of the sympathetic situated round about it. Nervous impulses travel to the defecation centre and are sent back therefrom to the abdominal muscles, to the colon below the splenic flexure, to the internal anal sphincter and to the levator ani. In health the action of this reflected impulse is so powerful that the abdominal muscles and the colon contract very vigorously; and the anal sphincter is fully relaxed throwing out the fecal matter. When the bowel is unloaded the levator ani and the external anal sphincter contract, and the function of defecation is finished.

Thus it will be amply clear that, it is the nervous mechanism that mainly controls the functions of the colon and the rectum. If for any reason, this control degenerates, the movements of the colon suffer; and matter begins to stagnate resulting in constipation.

Among the causes that lead to the degeneration of the colon nerves, modern civilization occupies the most prominent place. The mile-a-minute race that the civilized man has to run for his survival, forces upon him modes of living that are totally against nature. The point which directly concerns us here, is the suppression of the call of nature. Speaking from the Indian point of view, the misfortune begins even as early as one's school-days. A false idea of discipline helped by total ignorance of physiology, makes the schoolmaster so rigid that he does not brook even a single student's asking his permission to leave the class-room for easing himself! The boy has to choose between the disgusting inconvenience due to the resistance of an urgent call and the angry frown, the cutting

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tongue or at times even the blood-thirsty cane of a haughty dignitary! Very often there is, indeed, the danger of causing a break in the sweet flow of a melodious lecture being delivered by a love-inspiring personality! But after all, the school and college life is such as does put an unnatural restriction upon the bowel function. Nor does the boy fare better in his after-life. If he has to satisfy himself with being a clerk, he must drudge at the desk for hours together without a minute's break; or dance attendance upon a whimsical superior who bears no absence! If his qualifications allow him a more honourable walk of life, still he is not much better. As a doctor he has to be busy with his patients, at times, for hours without the slightest leisure; or as a counsel he is required to conduct a lawsuit from which he cannot free himself at his convenience. If he takes to business, still the same fate awaits him there. In fact everywhere artificial restrictions do not allow the civilized man to have bowel movements whenever required by nature.

The evil is much more accentuated in large cities. The private latrine arrangements are so defective, that people have to keep waiting over a long period for their turn. Nor are the public arrangements much better. In English, German, French and Austrian cities, places are abundantly provided where well kept toilet conveniences are offered at a very small cost. But here in cities like Bombay and Calcutta this is almost unheard of! Local trains also hardly allow any such convenience to the bulk of the daily passengers, as if it is none of the railway company's business!

The result is terrible. The call of nature comes only when some of the fæces are introduced into the rectum by the downward contraction of the colon. But if the call is not answered and the bowels are not permitted to move, the fecal matter has to lie in the rectum and cannot go back, the rectum having no anti-peristaltic action for the backward movement of its contents. The process of absorption that is ever going

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[Ch. 3]

on through the walls of the colon and the rectum, whenever they are full, removes water from the fæces thus detained in the rectum, and renders them harder and harder every hour. These hardened masses of fecal contents go on mechanically stimulating the rectal nerves, till at last they are completely exhausted; and refuse to set up any reflex action which, as we have already observed, leads to defecation. If in this way one is required to suppress the call day after day, the rectal nerves become so much degenerated that no call is felt, even when matter is forced into the rectum; and constipation is the result! The pelvic loop acts as a reservoir of the fæces before they are discharged. But when there is no evacuation, these loathsome deposits accumulate, and so distend the loop that it becomes almost crippled. The wave of stagnation travels backward, till at last the ascending colon and the cecum are affected. The lingering liquids here begin to putrefy, dangerous toxins are manufactured, and the whole nervous mechanism of the colon degenerates by the action of these poisons upon it. In the meanwhile these toxins are absorbed into the system; and auto-intoxication follows, bringing in its train a host of diseases leading to untold miseries.

There is another way in which modern civilization affects the bowels and causes constipation. The dietary adopted by the modern civilized world is such as easily lends itself to putrefaction disabling the colon. *Chillies* and *spices* irritate the intestinal wall and incapacitate the bowel nerves.

An ulcer, a cancer or a tumour, anywhere in the bowel, is very often at the root of constipation. An injury to the spinal nerves supplying the colon, may also lead to constipation. Soon a vicious circle is established. Constipation promotes nervous degeneration and nervous degeneration promotes constipation. Ultimately both are thoroughly established, and serious symptoms of auto-intoxication become visible making a man prey to lifelong miseries.

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Thus far we have discussed how the nervous control of the colon wall degenerates, and how it leads to intestinal stasis. Now we shall see how the muscular control is impaired and how it bears similar results.

It is a universal physiological law that muscles, whether voluntary or involuntary, act under the influence of nerve impulse. If the nerve impulse is strong, the muscles contract vigorously; if the nerve impulse is weak, the muscular contraction is feeble. According to this law, when the nervous mechanism of the colon degenerates, its muscular wall begins to be inactive. The nervous impulse carried to the muscle is so weak that, if at all, a very feeble contraction is the result. This want of natural contraction and relaxation weakens the muscular tissue. This weakness is accentuated by the distension of the colon wall due to the ever increasing accumulations of fecal matter. Again the poisons manufactured from putrefying food stuffs, are chemically acting upon the muscle tissue, fast sending it out of use. Perpetual distension and want of activity affect blood circulation which consequently suffers and adds to the original trouble. The result is that the colon so completely loses its muscular tissue that, it becomes a mere sack for holding the fecal matter which produces horrible toxins and endangers the very life of the patient.

Under such circumstances, the question arises whether we can mend the colon or should end it by an operation. We have already said something about the surgical remedies, in the first part of this article. We would, however, say here a few things more, making our position clearer still.

Impartial expert medical opinion is coming to the conclusion that, the removal of the colon is very rarely needed, and that almost all the cases of constipation can be treated by non-operative methods. We are quoting a typical case indicating surgical treatment, with a view to show how rare would such cases be.

The surgeon says, "I recently operated upon a lady and removed the whole of the large intestine and cecum. It

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[No. 3]

measured over 3 feet in length and from 4 to 5 inches in diameter. Microscopic sections cut at different levels from the wall, showed no trace of muscular tissue; and it was evident that muscular walls of the bowel had completely atrophied. The colon had become a sack into which everything passed, and which could only be evacuated by gravity and the application of pressure to the abdominal wall. The enormous distension of the abdomen which resulted from accumulated gases within this colon had, however, caused such atrophy of the abdominal muscles that they were unable to assist in evacuating its contents."

Under such exceptional circumstances surgical operation is the only remedy and should willingly be undergone. But where the degeneration of the large bowel is not so complete, an operation is not desirable, not only because it is unnecessary, but because it leads to trouble.

Let an expert surgeon give his evidence.

"Slesinger[1] has traced 25 of Lane's cases for a period of about seven years: 18 of these were quite well, 3 were better, 2 were not better, 2 subsequently died. Although these figures are too few to give any very definite conclusions, they appear to show that where the operation of the colon is done in extreme cases of stasis where the bowel has completely degenerated, the results are on the whole good, and the patients are permanently benefited as the result of the operation. On the other hand, where the colon is not seriously degenerated, the results are far from satisfactory—in fact, some of them appear to have been made invalids by the operation.

"Professor Sir Arthur Keith, who has made a careful examination of fifteen cases after operation, found marked changes in the small intestine as the result of the removal of the large bowel. He found there was a tendency for the small intestine to shorten and dilate, so that it came in time to resemble the large gut.

1 *Diseases of the Rectum and Colon.*

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"Dr. Hurst maintains that the removal of the ileo-cecal sphincter has a most harmful effect on the digestion, and allows ascending infection of the small gut."

Thus it will be quite evident that surgery has a very limited scope in the cure of a degenerated colon wall. Non-operative measures are the only rational treatment in almost all the cases.

Now, the use of massage, exercise, electricity or enema should be the only things modern therapeutics would recommend for regenerating the nervous and muscular control of the colon. For centuries Yoga has recommended Nauli and Basti as the most efficient weapons to fight out the colon weakness. In what follows we shall study the relative merits of these ancient and modern methods, and shall show that the Yogic methods are far superior to their modern substitutes in almost all respects, especially when cecal constipation is to be combated.

(To be continued)

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The Popular Section

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N. B. — The Director of the Kaivalyadhāma entreats every man of means to show his active sympathy for the Āś'rama.

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SARVĀÑGĀSANA

or

THE PAN-PHYSICAL POSE

PART II

In the first part of this article we have taken a short survey of the effects of the Pan-Physical Pose upon the thyroid. In this part we wish to study this posture from the point of view of the *parathyroids*.

The *parathyroids* are small bodies, usually four in number, situated near or imbedded in the very substance of the thyroid. They are so small in size that they measure, on an average, about 6 mm. in length, and 3 to 4 mm. in breadth. In man the nervous mechanism and blood supply of the parathyroids are so closely connected with those of the thyroid that they do not require a separate treatment. We have seen in the first part of this article that the Pan-Physical Pose can build a healthy thyroid by improving its blood and nerve supply. Now, as the same blood and nerve supply influences the parathyroids it naturally follows that the pose can also improve the parathyroids.

Though the thyroid and the parathyroids are very closely related in man so far as their anatomical positions are concerned, it should by no means be supposed that they have the same structure and functions. In fact in the human embryonic condition the two glands are quite distinct; and in the lower vertebrates they continue to be entirely distinct even afterwards.

Students of histology[1] know that the thyroid and the parathyroids possess quite different structures; and that there is no

1 Histology is the science of the minute structure and composition of the different tissues of organized bodies.

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truth in the supposition that the parathyroids are only immature thyroid. Scientists, however, continued to be under the influence of this supposition for a long time; and in the early researches in the functions of the thyroid, these little glands were not given any individual attention. The result was that the functions of the parathyroids were attributed to the thyroid. For instance, when the parathyroids are removed from an animal, it suffers from convulsions. Now for many years whenever the thyroid was extirpated the parathyroids also were removed with it, being looked upon as a part of the thyroid; and when the animal was thrown into convulsions, these were traced to the destruction of the thyroid, though they really arose from the removal of the parathyroids. Afterwards it was found that the extirpation of the thyroid would not induce convulsions, so long as the parathyroids were intact; but convulsions would follow if the parathyroids were removed, in spite of the fact that the thyroid was entirely preserved. The conclusion was clear. The loss of parathyroids alone was to be held responsible for the convulsive results.

Like all other ductless glands the parathyroids have an internal secretion. The blood stream that is circulating throughout the body, carries this secretion with it, spreads it to the entire muscular tissue world, and with its action neutralizes a poisonous substance that is being constantly formed there. When the parathyroids are removed, their secretion is stopped and the poisonous substance, instead of being neutralized, gathers in the muscles causing convulsive symptoms.

Even when the parathyroids are not cut off, there is always the possibility of their being degenerated and yielding little or no secretion. Like extirpation, this degeneration also leads to convulsions. Now the Pan-Physical Pose, just as it can improve the thyroid, can improve the parathyroids and make them give out their regular internal secretions. In the last part of this article we have proved that the physiology of Sarvāṅgāsana can influence the thyroid. The same arguments

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hold good in the case of the parathyroids and hence we do not wish to repeat them here.

We will not, however, be able to appreciate the importance of improving the parathyroids, unless we understand what the above mentioned convulsions mean and how the loss of parathyroid secretion affects our life.

We have already noticed[1] in the Semi-Scientific Section what a reflex action is. Suppose you are sitting by the side of fire. Unconsciously you happen to bring your fingers too close to it. Immediately, without the intervention of your consciousness, the muscles of the whole hand contract and it is violently withdrawn. Now, what has happened? Why did the muscles contract? The heat of fire started impulses in the nerves of the finger-ends. The impulses travelled to a centre in the spinal cord and were sent back by the centre again to the finger-ends. The impulses that came back, threw the muscles into contraction and withdrawal was the result. Instead of stopping with the spinal cord, if the impulses were to travel to the brain, a sensation of heat would be felt, along with the withdrawal of the hand.

Thus it will be seen that muscles contract and relax on account of reflex actions even without our conscious effort. That is exactly what happens in convulsions. The poisonous substance, when not neutralized by the parathyroids, affects the nerves and induces reflex actions. The result is that the muscles begin to jerk and jump without any rhyme or reason!

One of the forms these convulsions take is *epilepsy*, popularly known as *falling sickness*. When the epileptic fit comes, the patient suddenly gets pale, utters a terrible shriek, and falls senseless to the ground. Soon his whole body becomes rigid and his breath is stopped. His mouth begins to foam and jerky spasms violently shake his whole body. After a short time, the spasmodic movements gradually decrease and the sufferer begins slowly to return to consciousness.

1 Vide p. 198.

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Researches in organotherapy are tending to the conclusion that the parathyroid treatment is able to check epilepsy by improving the parathyroids and getting the necessary internal secretion. The evidence of organotherapy and the physiological considerations of the Pan-Physical Pose, led us to try the Sarvāṅgāsana treatment in the case of a young man who suffered from epilepsy. The treatment was followed half-heartedly; and yet, within a six months' time, the patient reported to us that he was fast improving. We had no occasion to hear from the patient any more, nor had we any occasion to try this treatment in any other case.

The clinical evidence adduced here is too meagre to authorize any generalization. It has been introduced here solely with a view to encourage epileptics to take to the Sarvāṅgāsana treatment, because we are of opinion that the said treatment will be very largely useful in controlling the falling sickness.[1]

Authorities seem to be unanimous in declaring that the age of puberty is most prone to epilepsy. In an overwhelming majority of cases the disease starts before the age of twenty, only a slight difference being seen in the case of females. Therefore it is quite desirable for the young folks of this age, especially if their heredity is epileptic, to practise Sarvāṅgāsana and thus avoid the danger of epilepsy.

One need not wait to see the disease taking a serious turn. Very often the malady expresses itself in very mild forms, and if precautionary measures are adopted betimes, the terrific attacks can be avoided.

But apart from the cure or prevention of epilepsy, there is another reason which makes the practice of the Pan-Physical Pose essential nearly to every man whether young or old.

1 Epilepsy always means extremely irritable nerves. Consequently the Sarvāṅgāsana treatment is likely to succeed better, if it is accompanied by exercises for quieting the nervous system.

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It has been found that the muscular tone is very largely influenced by the secretions of the parathyroids. Now every man, whatever his age may be, wants his muscles to be maintained in their proper tone; and for this he must see that his muscular tissues get the necessary quantity and quality of the parathyroid secretions. What is the easiest way of doing this? We say the practice of Sarvāñgāsana which has been shown to preserve the parathyroids in a healthy condition.

(To be continued)

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SOME POSES THAT HELP TO CURE CONSTIPATION

S'ĪRSHĀSANA AGAIN

In the last issue of this journal, we have already stated some circumstances under which a man becomes disqualified for the practice of S'īrshāsana. There is another circumstance under which the practice of this pose is not desirable. The circumstance is such as should have been within the knowledge of every student of physical culture, and that is why we made no mention of it in the last number. But during the last few months we have seen so many examples of palpable ignorance in this regard, that we have thought it imperative to draw people's attention to this new limitation.

People who take to Yoga as a system of physical culture or therapeutics, are many times in the habit of combining S'īrshāsana with violent exercises such as wrestling or running.

We do not know much of other provinces in India; but in Mahārāshtra including Berar aud Marāthi C. P., there are a number of well organized gymnasiums largely attended by the young folks of the town. The enthusiasm with which these youths work in their institutions, the devotion they bear to their instructors and the brotherly affection they feel for one another, these and so many other things connected with these gymnasiums have a peculiar charm all their own. Wrestling is the most favourite game with these young athletes. Beautiful arenas, full of medicated red earth, are the places where the combatants meet, not as jealous competitors but as bosom friends. As every pair finishes its game, it does not retire from the arena, but takes its seat there in a corner to witness the performance of the other gymnasts that follow. After the

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last match is over, the happiest part of the job commences. All the wrestlers gather round their revered instructor; and sit in the arena indulging in a random talk during which many a harmless joke is cut. Owing to the vigorous muscular work done in wrestling and the period of rest that follows, every athlete feels so light in body and mind, that he experiences a sort of celestial pleasure at this hour. Carnal as these joys are, they make the nearest approach to those of spiritualism! Unlucky is the man that has never shared these joys of athletic life!

It is at this hour that someone of the happy circle proposes a show of the Yogic poses; and S'īrshāsana being the most majestic, is freely indulged in. If the period for which the pose lasts is short, and if the period of rest taken after the match is sufficiently long, the combination of the practice with wrestling does not prove harmful. But if one of the two is otherwise, especially if the time allowed for rest is very short, S'īrshāsana is likely to be injurious. We have seen some cases where the exercise of this pose is taken immediately after wrestling. This is quite dangerous.

The reason is obvious. The exercise of wrestling is so thorough and so violent that the whole muscular system is worked up. The waste products resulting from this work accumulate in the muscle tissue; and the rapid blood circulation is busily engaged in removing these waste products as well as in repairing the damages. If at this juncture the wrestler stands on the head, he diverts the whole blood stream to his brain and starves the other parts of his body. Nor is this sudden rush of blood to the brain calculated to do any good to it. Nay, it is positively harmful.

The combination of S'īrshāsana with running is equally dangerous. Recently a young student from the southern side of our country found himself in trouble for this mistake. Having had some digestive complaints, he started standing on the

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head for a cure. In a period of some four months, the youth not only got over his complaints but felt strong enough to take to running. Immediately after a vigorous run of half an hour, he would stand on the head. Serious symptoms began to show themselves as a result of the bad mistake for which none but the youth himself was responsible. The middle part of the head became soft and painful. One day, while the young gentleman was standing topsyturvy, the painful part perspired freely; and in this sweat he found some red particles which he took to be clots of blood. The man was alarmed and directly consulted us.

The first thing we had to advise, was to stop the practice forthwith. We also advised ice application to the sore spot; and in about a fortnight's time he was quite well.

There is absolutely nothing in S'īrshāsana that can be put down as dangerous. It is only an ignorant and mistaken use of it that creates trouble. If one wants to get the full benefit of the Yogic poses, one should practise them by themselves. The poses do not at all preclude any other exercise. But they do demand a sufficient period of rest either before or after the other exercises.

What has been stated above should not give the impression that we are opposed to gymnastics. Far from it. We are, at every step, conscious of the high value muscle has in national economy; and sincerely advocate muscular development in the case of every man that cares for his country. Yoga takes notice of muscle only incidentally, and as such can never take the place of gymnastics even as a system of physical culture. What we maintain is that, as far as health, longevity and brain power are concerned, no system of physical culture can be equal to Yoga; and therefore people wishing to do brain work, will find the Yogic exercises most useful.

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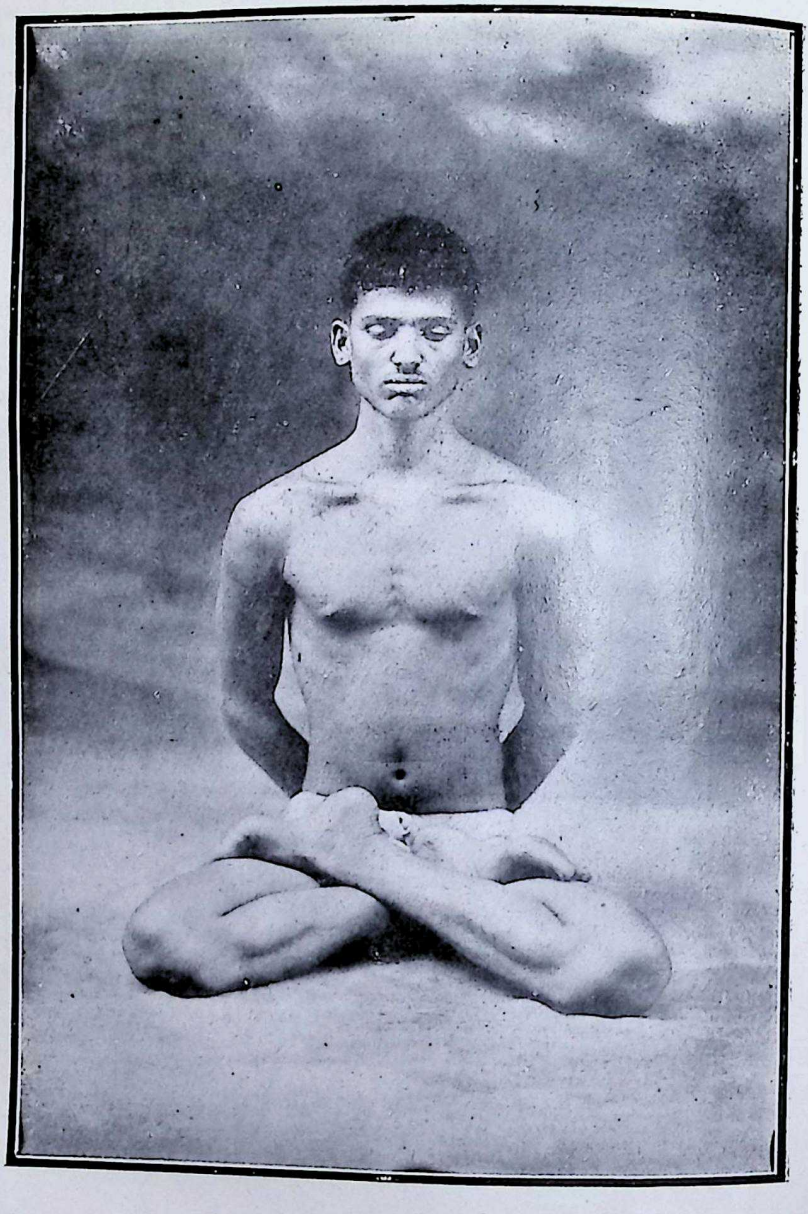
Fig. LXIX



Preparation for Yoga-Mudrâ.

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Fig LXX

Yoga-Mudrâ or The Symbol of Yoga.
(Side view)

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YOGA-MUDRĀ

or

THE SYMBOL OF YOGA

THE NAME :—

The word Yoga-Mudrā is formed of two members Yoga and Mudrā. We shall not try to define either of them physiologically[1], because to the best of our knowledge, the physiological denotation of both these terms is yet to be definitely known. In all probability the word Mudrā is used here to mean a symbol ; and the exercise is called Yoga-Mudrā, because it awakens spiritual forces dormant in man. It is specially useful in liberating the Serpent Power, technically called Kuṇḍalinī.

THE TECHNIQUE :—

The first step in this practice is to prepare the foot-lock. A reference to p. 57, of the current volume will give detailed instructions for making this foot-lock ; and Fig. XXIV will illustrate the variety needed for the practice of Yoga-Mudrā. In this connection it is to be noted that the two heels must press against the portions of the abdomen that they touch. In Fig. LXIX the right heel should have been a little higher up, so that it could have exerted pressure upon the pelvic loop. The left heel is in its place and presses the cecum. After the feet are folded in a lock, the hands are to be folded on the back. This is done by grasping the left wrist in the right hand, as

1 We have ventured our own physiological definitions or descriptions wherever we could get accurate physiological data. For instance we have defined the word Uddiyāna physiologically (vide p. 11 of the current volume), to the exclusion of the spiritualistic definitions offered in the Yogic texts.

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shown in Fig. LXX. Next the student bends himself forward and tries to lie flat upon his heels, so as to touch the ground with his forehead. Fig. LXX gives the final position.

Care must be taken not to give jerks to the spinal column. Many people find it difficult to secure the necessary bent. They should try to bend as far as they can do so smoothly and comfortably. What little bent may have become possible should be maintained for a time. This will enable the student to bend himself better; and after a practice continued for days, he will find even the last position quite easy.

When Yoga-Mudrā is to be practised as a replacing exercise (vide p. 204), this technique requires a little change. The hands instead of being folded upon the back, are to be placed on the heels, so as to grasp these in their hollow. Thus a sort of big ball is available in front of the abdomen, the lowest parts of which are already in contact with it. When the student begins to bend, these parts are pressed; and as he continues to bend still further, the upper parts of the abdomen are also successively pressed in by the convex surface of the rounded hands. In this way a steady upward pressure is maintained on the abdomen; and prolapsed organs are pushed upwards and held in their proper places.

During both these varieties breath is allowed to flow as usual. Exhalation as one bends, is likely to be helpful, especially in the second variety.

When practised as a pelvic exercise, or as a replacing exercise for the whole abdomen, Yoga-Mudrā should last only for a few seconds—from 5 to 10 at the most. It may be profitably repeated from 3 to 7 times at a sitting.

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No. 3]

POINTS OF STUDY :—

(a) *Vertebræ* :—

The lumbosacral vertebræ receive a steady pull posteriorly.

(b) *Nerves* :—

The lumbosacral nerves are toned up.

(c) *Miscellaneous* :—

The cecum and the pelvic loop are usual seats of bad constipation. In this practice the left heel presses against the cecum and the right against the pelvic loop. This pressure when slowly, steadily and repeatedly applied, has power to stimulate these parts to action; and thus to reduce constipation.

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HALĀSANA

or

THE PLOUGH POSE

THE NAME :—

The pose is called Halāsana because in its practice the body is made to imitate the Indian plough. Hala means a plough in Saṅskṛita.

THE TECHNIQUE :—

To start with the student lies supine on his seat as in the case of the Pan-Physical Pose. (Fig. XVIII). Then he slowly raises his legs through the hip-joint till they make an angle of 30° with the ground. Here the legs are kept steady for a few seconds, and then raised through another 30°. Again they are kept steady here and again raised so as to complete a right angle. This is maintained for a few seconds again.

(These stages have not been prescribed in the Yogic texts, nor are they required by different Yogic traditions. They are included here as they can be easily developed while raising the legs through a right angle, and are helpful in relieving constipation).

At this point the student keeps his trunk, as far as possible, close to the ground; and only bends his legs further, raising his hips and the lower part of his back only as much as is needed for the first stage of the pose, as illustrated in Fig. LXXI. The legs that are now carried through more than 90°, are lowered on the side of the head, so much so that the toes are made to touch the ground. The toes should rest on the nearest point beyond the head; and the whole pressure of the hips and thighs

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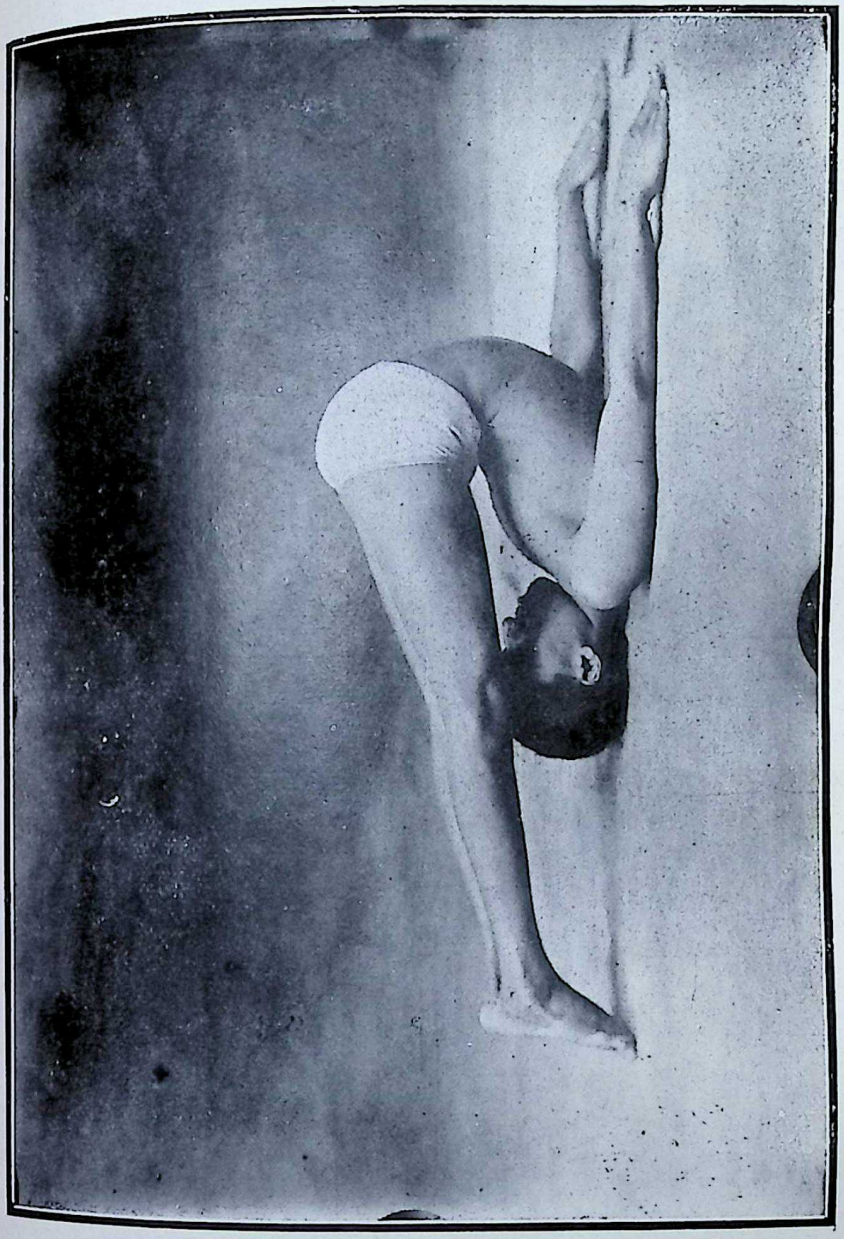

Halâsana or The Plough Pose.
Lumbosacral Exercise
(Side view)

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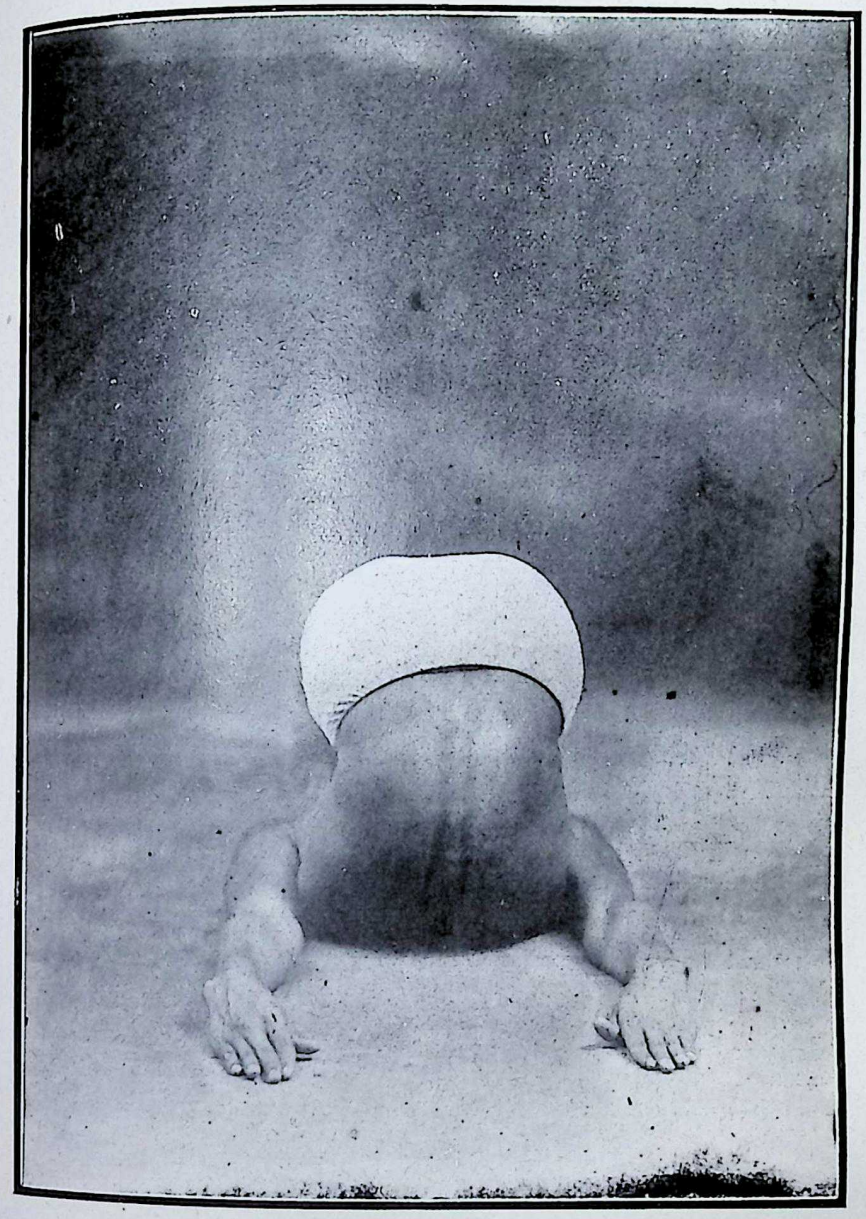
Fig. LXXII



Halâsana or The Plough Pose.
Lumbosacral Exercise
(Back view)

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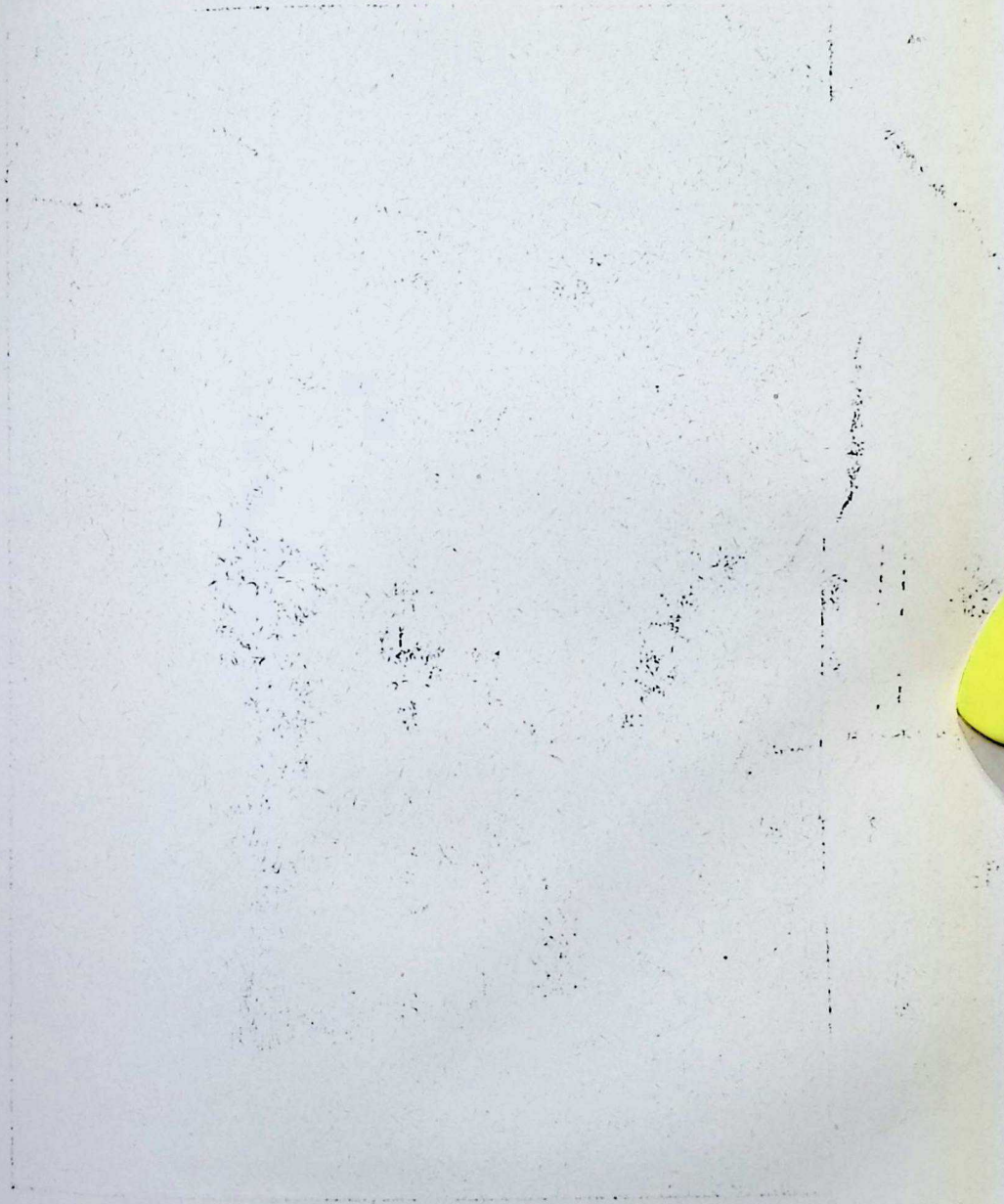

पुस्तकालय
गुरुकुल काँगड़ी

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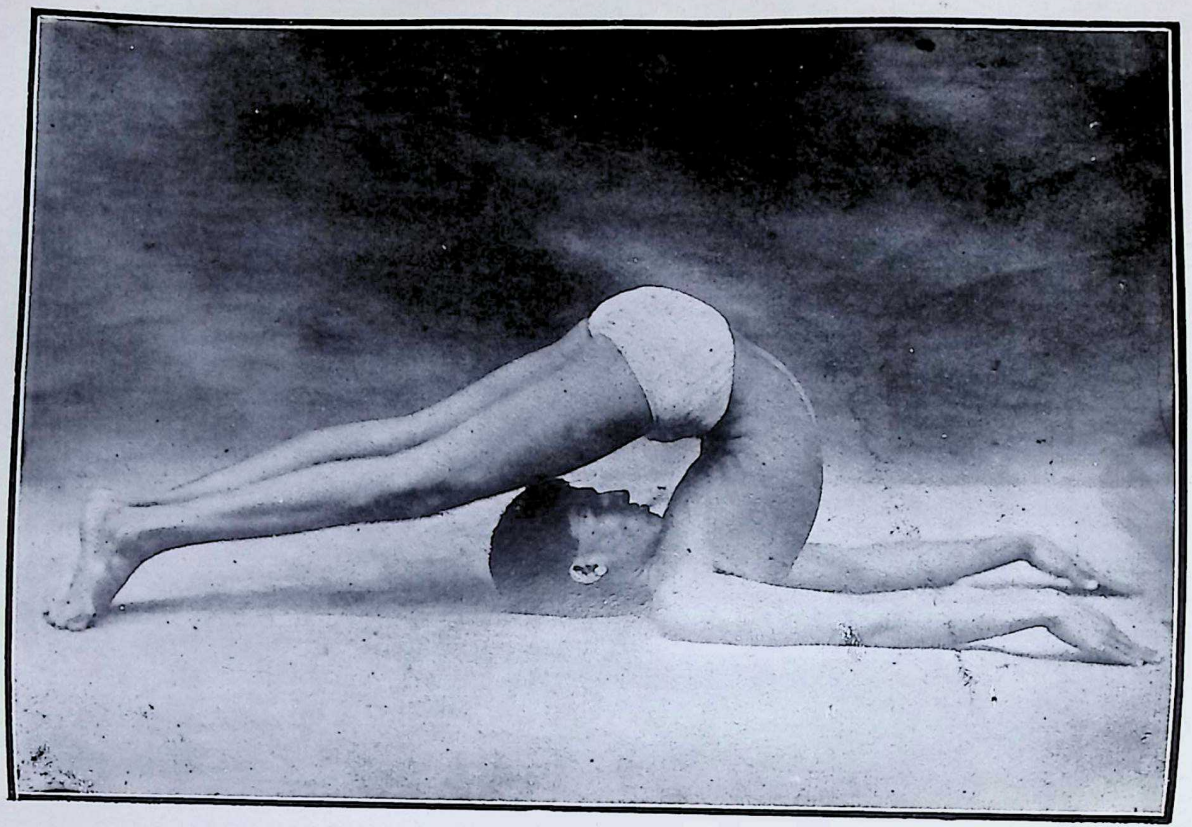
Fig. LXXIII



Halâsana or The Plough Pose.
Lower Dorsal Exercise
(Side view)

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Lower Dorsal Exercise
(Side view)

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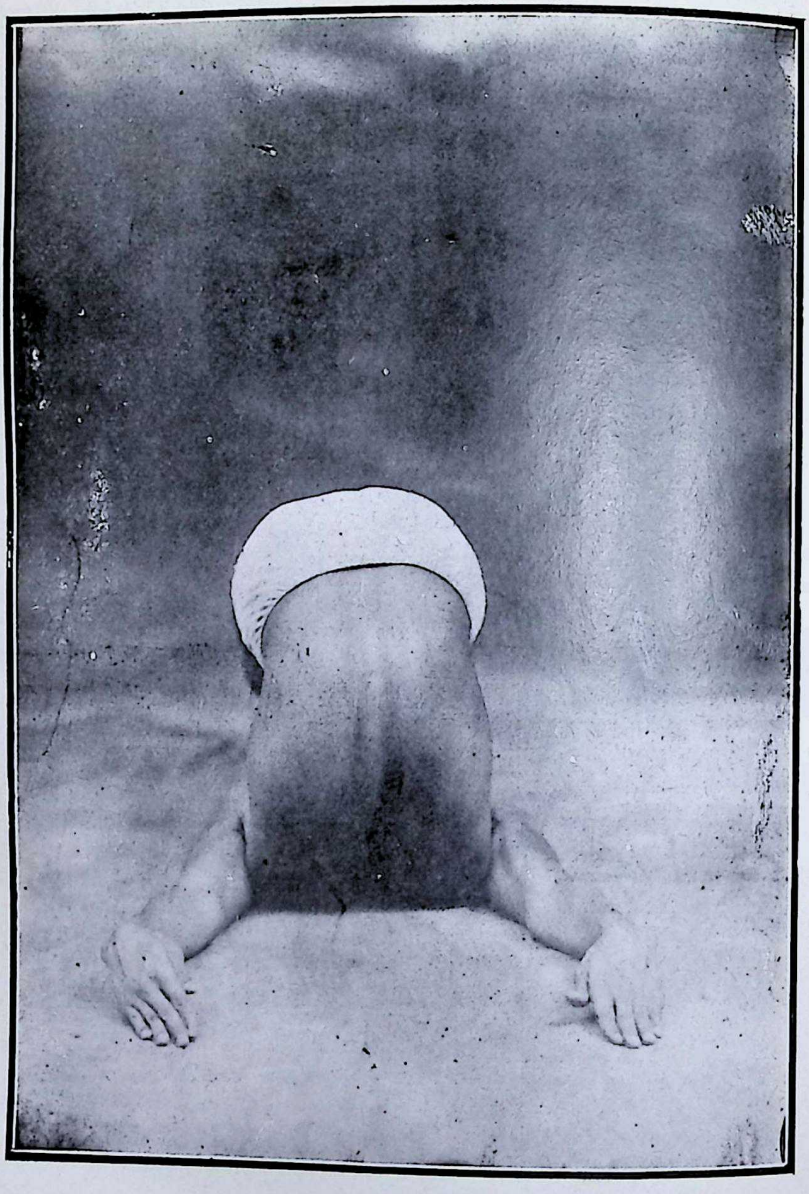
Fig. LXXIV



Halâsana or The Plough Pose.
Lower Dorsal Exercise
(Back view)

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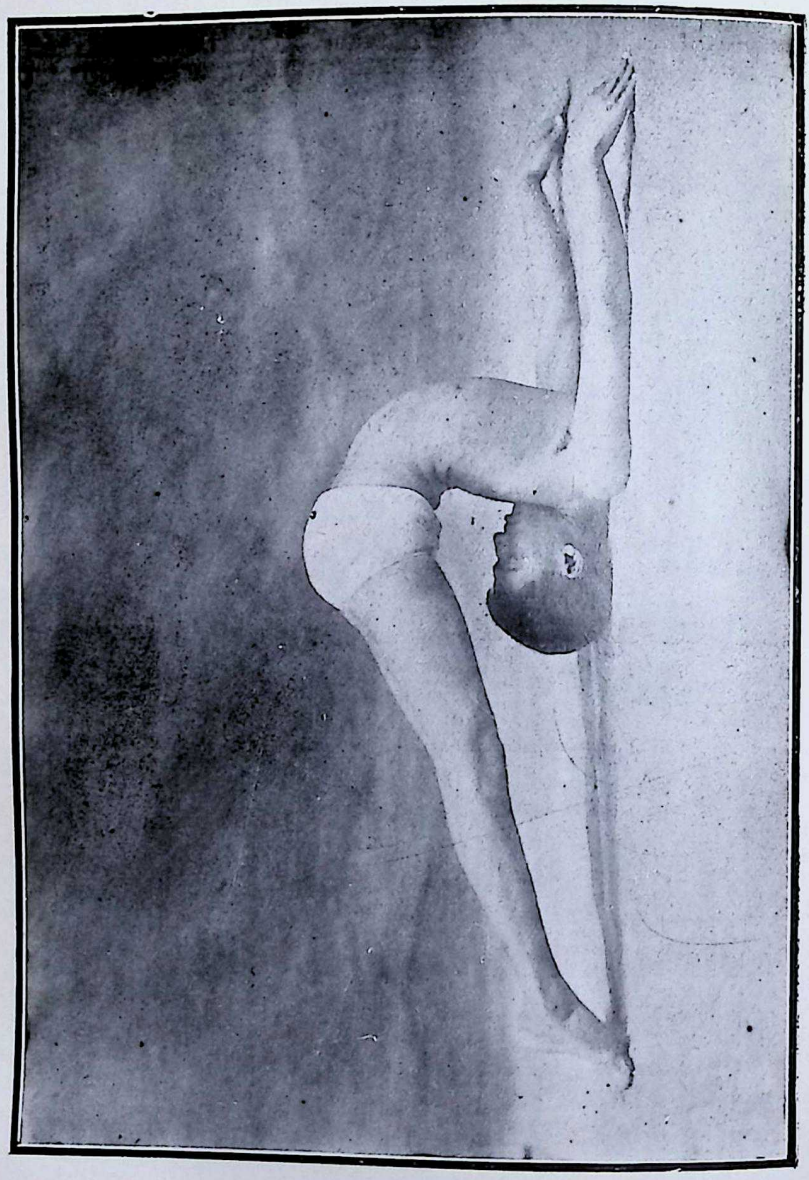
Fig. LXXV



Halâsana or The Plough Pose.
Upper Dorsal Exercise
(Side view)

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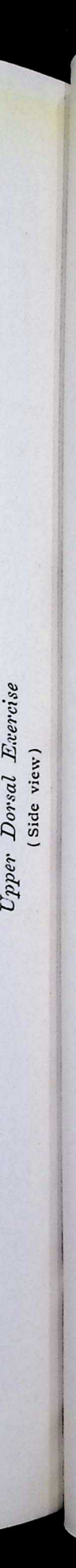

Upper Dorsal Exercise
(Side view)

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Fig. LXXVI

Halâsana or The Plough Pose.
Upper Dorsal Exercise
(Back view)

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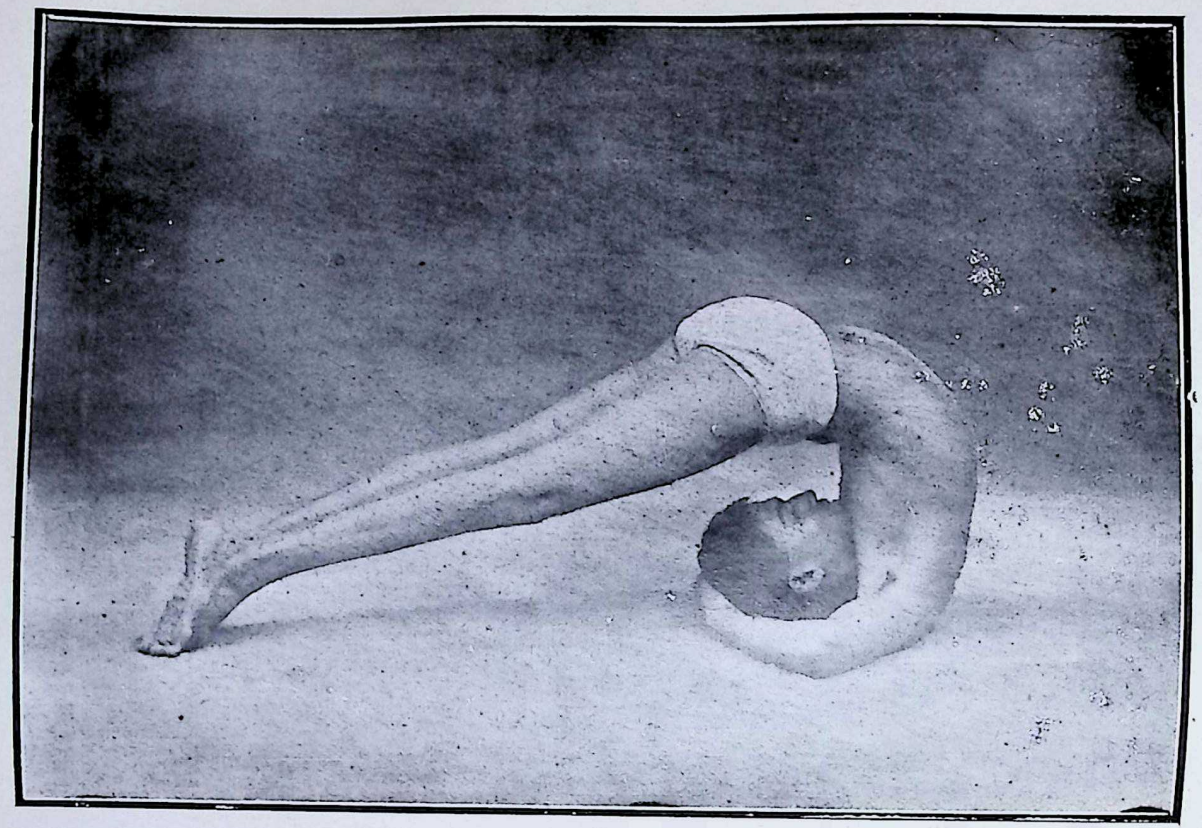
Fig. LXXVII



Halâsana or The Plough Pose.

Cervical Exercise

(Side view)

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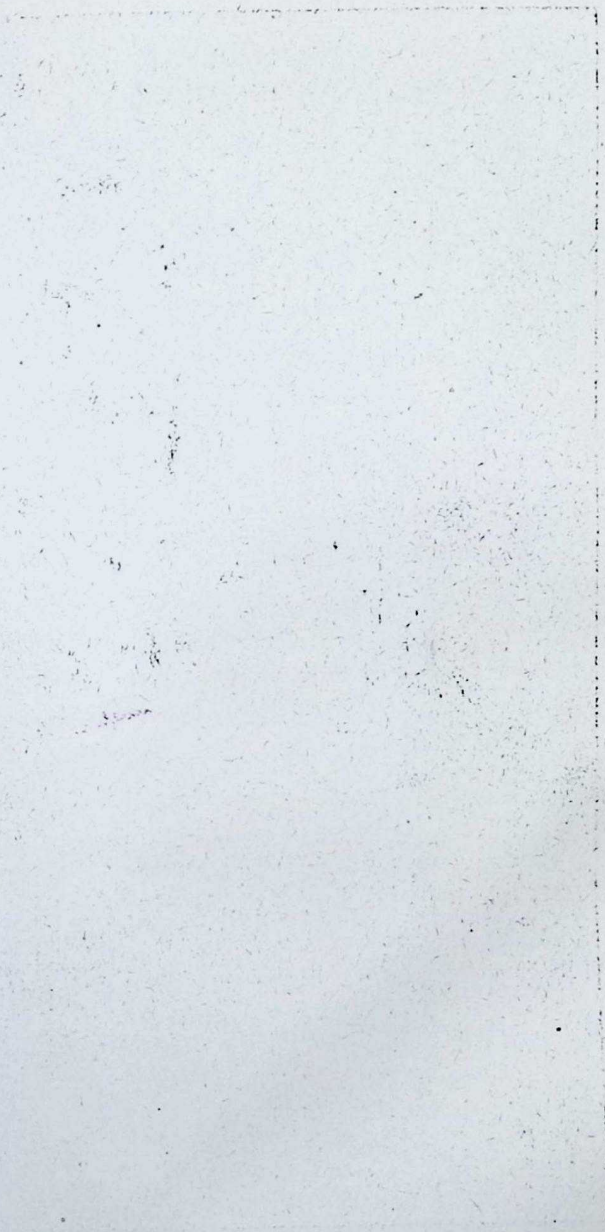

Cervical Exercise
(Side view)

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Fig. LXXVIII

Halâsana or The Plough Pose.
Cervical Exercise
(Black View)

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No. 3]

should be thrown on the lumbosacral region of the spine. During this as well as the next two stages, the hands are not allowed to change their extended and passive position. As usual these movements must be accomplished smoothly and steadily. If the full curve cannot be secured at the very first attempt, it should be attained bit by bit every day. Fig. LXXI gives a side view of this first stage of Halāsana, whereas Fig. LXXII gives a back view of the same.

When this stage has been maintained for a few seconds, the toes are pushed farther from the head, till the pressure of the curve is felt at the lower dorsal region. This constitutes the second stage, and is represented in Figs. LXXIII and LXXIV.

After a few seconds' pause here, the toes are again slided further away, till at last the farthest point is reached, and the burden of the curve is thrown on the upper dorsal part. This is shown in Figs. LXXV and LXXVI.

A few seconds in this stage, and the student prepares himself for the final one in Halāsana. The hands which upto now played only a passive part, are withdrawn from their place; and after being taken beyond the head, are there made to form a finger-lock. This lock is explained on p. 14 in the first issue, and is illustrated in the next number in Fig. XLIII. The lock is placed just near the head and the toes are pushed back again, till the pressure of the curve is experienced at the cervical part of the spine. This presses the chest so tightly upon the chin that a perfect chin-lock (vide p. 54 of the current volume), is effected. (Vide Figs. LXXVII and LXXVIII). The final stage may be maintained for 20 to 30 seconds.

Then the fingers are unlocked, the hands are restored to their original extended position, and the toes are drawn nearer the head. Again the same steps are retraced in

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the reverse order, till at last, the student lies supine on his seat as he originally did.

It is more desirable to repeat the practice than to maintain the different stages of the pose for a long time in one and the same attempt. This does not apply to spiritual purposes which require the first stage to be kept up for a considerably long time.

POINTS OF STUDY :—

(a) *Muscles*:—

Halāsana is one of the finest stretching exercises for the muscles of the back. As it is well-known, these muscles are responsible for the health of the spine. That is why stretching exercises are best calculated to improve the health of the vertebral column. The abdominal muscles contract for flexing the hip-joint.

(b) *Vertebræ* :—

The whole spine receives a steady pull posteriorly, every vertebra and ligament taking part in the work. If there be any slight displacements in these bones, they are corrected.

(c) *Nerves* :—

All the 31 pairs of spinal nerves and the sympathetic are toned up. Because this pose promotes blood circulation of the parts where these nerves arise.

NOTE—

This pose is opposed to Bhujaṅgāsana so far as the spinal curve is concerned. The two together constitute an excellent exercise for the back and the vertebral column. Whereas the Cobra Pose alternately contracts and relaxes the muscles of the back, this exercise stretches them; and thus the two together are able to build a powerful back. Figs. LXXIX and LXXX will enable our readers to appreciate the difference in the successive stages of this Āsana.

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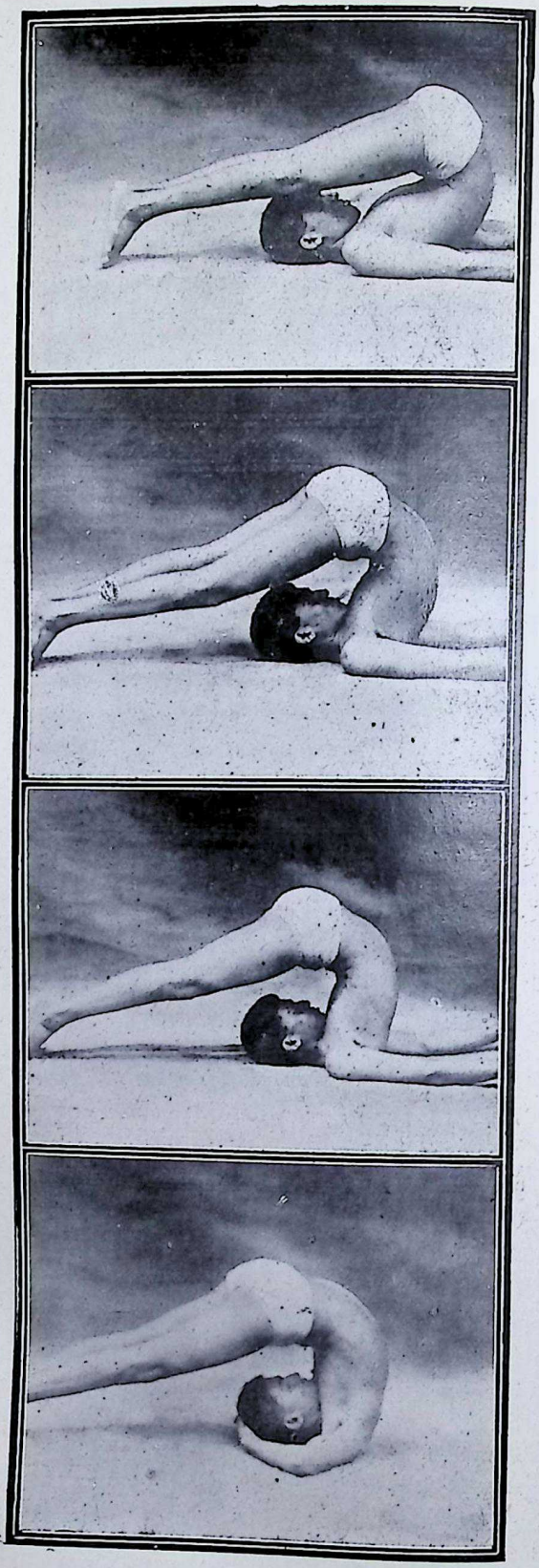
Fig. LXXIX



Halâsana in Different Stages.
(Side view)

Fig. LXXX

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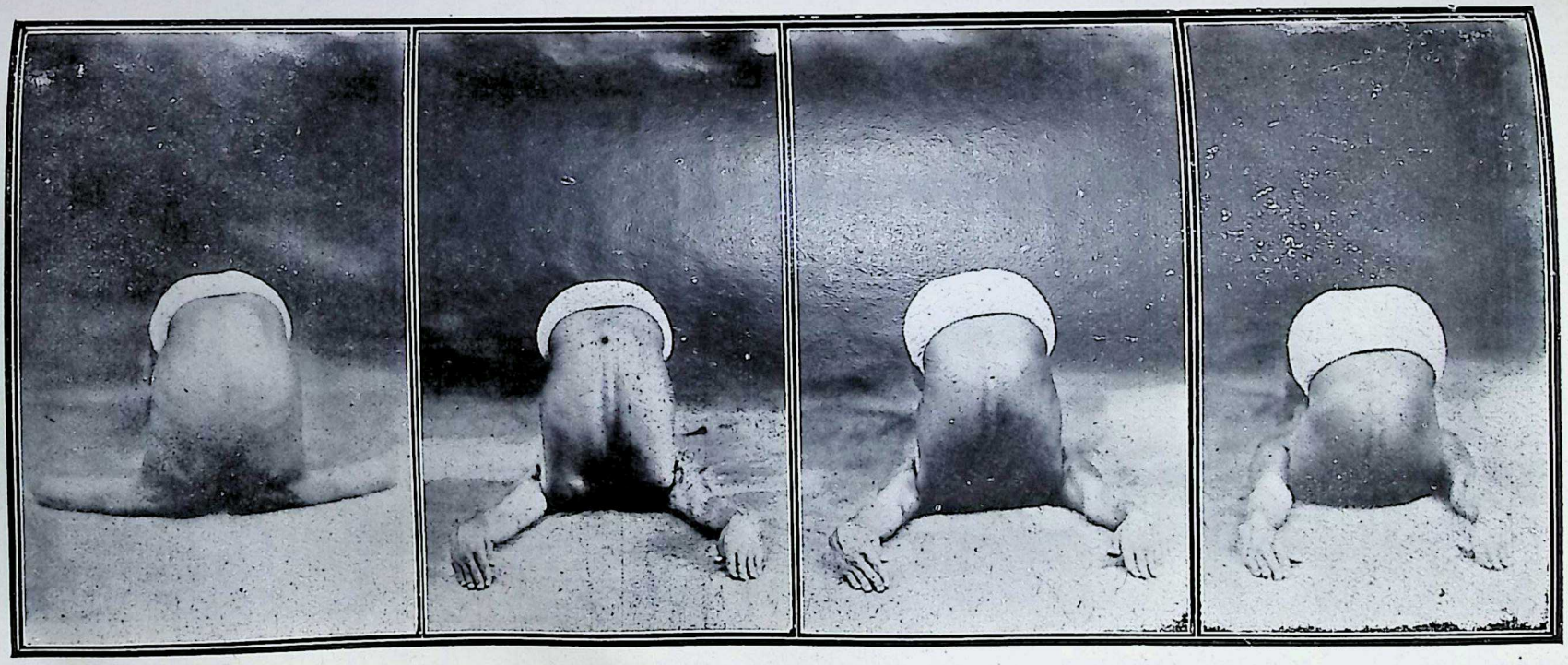
Fig. LXXX



Halâsana in Different Stages.
(Back view)

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Miscellaneous

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Following diseases, especially in their chronic condition, can be effectively treated by the Yogic methods:

1 *Constipation.*
2 *Dyspepsia.*
3 *Head-ache.*
4 *Piles.*
5 *Heart-disease (functional).*
6 *Neuralgia.*
7 *Diabetes.*
8 *Hysteria.*
9 *Consumption.*
10 *Obesity.*
11 *Sterility (certain types).*
12 *Impotence.*
13 *Appendicitis, &c.*

Therapeutical advice is given gratis at the Āś'rama to patients coming for consultation.

Arrangements have been made under the supervision of the Āś'rama for patients to stay on payment of actual expenses, Rs. 45/- per mensem.

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A PROBLEM

A young unmarried lady whose father himself was a well qualified and experienced medical man, writes to us as follows—

"*April 18, 1925.*

Dear Sir,

Having found in your first issue of the Yoga-Mimansa that the health of the whole body depends upon the health of the Thyroid, I began practising Sarvangasana very earnestly. After a trial of fifteen days, I could practise it for the full twenty minutes. For the last ten years or so I had small red patches of itch at the back of my head, which remained fresh in spite of all kinds of external and internal remedies. After a trial of fifteen days the patches began to dry up and at the end of three months they disappeared entirely. And although I have been obliged to give up the practice of Sarvangasana for the last three months, the trouble has not returned. My digestive powers which have been indifferent since childhood, were greatly improved during the practice.....

Yours faithfully

....."

Now is it the influence of the thyroid that cured the lady of her itches or is there anything else in Sarvāñgāsana that is responsible for the cure? We earnestly request medical men to think over the problem and send us their solution for publication.

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A FEW PERSONAL APPRECIATIONS AND PRESS NOTICES

DR. RISSOM, PROFESSOR OF PHYSICAL CULTURE,
HEIDELBERG UNIVERSITY, GERMANY.

"You have shown a friendly feeling in sending us the first issue of the periodical Yoga-Mimansa published by you. It has interested us very much as gymnastical exercises similar to those illustrated in your excellent photographs are now also practised by us more than before."

DR. L. N. CLARE, M. D., CARLTON, MINN., U. S. A.

"I received and read the October number which was interesting and instructive."

MR. G. R. S. MEAD, EDITOR, 'THE QUEST,' LONDON.

"I have only had time just to glance at it, but am already convinced that it will be of great service to serious students of Yoga in the West."

DR. CALDWELL, 'THE CALDWELL HEALTH HOME,' CALIF., U. S. A.

"We are in receipt of a copy of your magazine Yoga-Mimansa, and read with much interest. The breathing exercises and poses appeal to us, and we will try them out in our work. You have given evidently deep and careful study to the effects of the movements, and your researches are interesting."

DR. A. C. BISHARAD, M. R. A. S., (LON.), CALCUTTA.

"Your excellent journal is a new venture of its kind and I have read it with interest."

DR. GANANATH SEN, M. A., L. M. S., CALCUTTA.

"I have gone through the book carefully and have found the researches very interesting."

PROF. MANIKRAO, JUMMADADA VYAYAMA MANDIRA, BARODA.

"Your attempt to explain Yogic physical culture in the light of modern sciences has my heart-felt sympathy."

DR. T. R. SANJIVI, M. A., PH. D., D. LIT.
PRESIDENT, 'THE LATENT LIGHT CULTURE,' TINNEVELLY, S. INDIA.

"You are doing very useful work and the journal has found a great support in France. My agents in France speak very highly of the work and a strenuous effort will establish a branch of the Ashrama in Paris if a proper representative can be sent by you."

THE QUEST, THE QUEST SOCIETY, LONDON.

"During the last few years a gallant attempt has been made, under the supervision of Swami Kuvalayananda, to carry out a systematic and practical

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study of Hatha-Yoga, by applying to it Western methods of observation, with a view to demonstrating its *raison d'ètre* and its high therapeutic value. The results of these studies by Indian practitioners have been appearing in his very valuable periodical called *Yoga-Mimansa*."

THE MODERN REVIEW, CALCUTTA.

"Physical culturists, medical men, experimental psychologists and those who are classed as general readers should find the periodical interesting and instructive."

CURRENT THOUGHT, MADRAS.

"The issue before us is a very valuable and interesting production and fully justifies the unique place and the importance of the journal in the realm of modern scientific and philosophical literature..... The printing and get-up of the journal is fine, as befitting a scientific journal recording great truths."

UNITED INDIA AND INDIAN STATES, DELHI.

"From its general appearance and get-up of the journal and the matter it contains one can see that the work is in able hands and in time the institution will be as useful and popular as the New York Institute of Science."

THE JOURNAL OF AYURVEDA, CALCUTTA.

"The object of this journal, which is full of novel and interesting subject matter from the beginning to the end, is to record scientific researches in psychology, spiritual and physical cultures etc., with their practical application to therapeutics. We are quite proud to emphasise the fact that the Swamiji has fully succeeded in his mission. The magazine is for everybody..... The various poses and practices of Hatha-Yoga with their utility in curing different diseases have been well described and illustrated with excellently done-up half-tone photographs."

THE KESARI, POONA.

"Yogic culture is looked upon as something mysterious and secret. This endeavour to bring it before the popular gaze and to interpret it in the light of modern sciences is altogether unprecedented in this country."

THE LOKASHIKSHANA, POONA.

"It is a matter of great congratulation and satisfaction that Shrimat Kuvalayananda by the grace of his Guru was inspired to undertake the task of investigating Yoga in the light of modern scientific methods and principles..... It is obvious from his researches so far published how the Indian Yogic Lore can brilliantly and gloriously bear all the tests of modern science of the West.... Shrimat Kuvalayananda's undertaking is unprecedented, of great scientific and philanthropic significance."

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OUR LIST OF EXCHANGES

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EPIGRAPHIA INDO-MOSLEMICA, *Director General of Archæology in India, Simla.*

INDIAN JOURNAL OF PSYCHOLOGY, *92, Upper Circular Road, Calcutta.*

INDIAN MEDICAL RECORD, *2, Horokumar Tagore Square, Corporation Street, East Calcutta.*

JOURNAL OF INDIAN HISTORY, *'Sripadam', 143, Brodies Road, Mylapore, Madras.*

JOURNAL OF THE BOMBAY BRANCH OF THE ROYAL ASIATIC SOCIETY, *Town Hall, Bombay.*

NEW BURMA, *65/67, Fraser Street, P. O. Box No. 250, Rangoon (Burma).*

PRABUDDHA BHARATA, *182 A, Muktaram Babu Street, Calcutta.*

REPORT OF THE ARCHÆOLOGICAL DEPARTMENT OF H.E.H. THE NIZAM'S DOMINIONS, *Hyderabad (Deccan).*

REVIEW OF PHILOSOPHY AND RELIGION, *The Academy of Philosophy and Religion, D. G., Poona No. 4.*

THE BHISHAGVILASA, *Court Lane, Ahmednagar.*

THE BOMBAY CHRONICLE, *Hari Building, Old Custom House Road, Bombay No. 1.*

THE CHITRAMAYA JAGAT, *Chitrashala Press, 1026, Sadashiv Peth, Poona No. 2.*

THE JAIKARNATAKA, *Dharwar.*

THE JAINA GAZETTE, *436, Mint Street, Madras.*

THE JOURNAL OF AYURVEDA, *2, Horokumar Tagore Square, Corporation Street, East Calcutta.*

THE KALPAKA, *The Latent Light Culture, Tinnevelly, S. India.*

THE KESARI, *Gaikavad Wada, 568, Narayan Peth, Poona No. 2.*

THE KUMARA, *2707, Raipur, Ahmedabad.*

THE LOKASHIKSHANA, *395, Sadashiv Peth, Poona No. 2.*

THE MAHARASHTRA, *100, Badnispura, Circle No. 7, Nagpur City.*

THE MAHRATTA, *Gaikavad Wada, 568, Narayan Peth, Poona. No. 2.*

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THE PHILOSOPHICAL QUARTERLY, *Indian Institute of Philosophy, Amalner, E. Khandesh.*

THE PRABODHA, *Lane No. 2, House No. 12, Dhulia, W. Khandesh.*

THE PROGRESS OF EDUCATION, *The Aryabhushana Press, Poona City.*

THE PURUSHARTHA, *Svadhyaya Mandala, Aundh, Satara.*

THE QUARTERLY JOURNAL OF THE ANDHRA HISTORICAL RESEARCH SOCIETY, *The Andhra Historical Research Society, Rajahmundry, E. Godavari.*

THE QUARTERLY JOURNAL OF THE MYTHIC SOCIETY, *The Mythic Society, Bangalore.*

THE SAURASHTRA, *Saurashtra Ltd., Ranpur, B. S. Rly., Kathiawar.*

THE TATVAJNANAMANDIRA, *Indian Institute of Philosophy, Amalner, E. Khandesh.*

THE VAIDIK DHARMA, *Svadhyaya Mandala, Aundh, Satara.*

THE VIDYAPEETHA, *Kashi Vidyapeetha Benares Cantt., U. P.*

THE VISVA-BHARATI QUARTERLY, *Santiniketan, Birbhum (Bengal).*

THE VIVIDHAJNANAVISTARA, *364, Thakurdwar, Bombay No. 2.*

FOREIGN

GOOD HEALTH, *The Good Health Publishing Company, Battle Creek, Michigan, U. S. A.*

NATURE'S PATH, *236, East 35th Street, New York, N. Y., U. S. A.*

THE EASTERN BUDDHIST, *The Eastern Buddhist Society, 39, Ono-Machi, Koyama, Kyoto (Japan).*

THE MONIST, *The Open Court Publishing Company, Wieboldt Hall, 337, East Chicago Avenue, Chicago, Illinois, U. S. A.*

THE OCCULT REVIEW, *Paternoster House, London, E. C. 4.*

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Yoga-Mīmānsā

EDITED BY

S'RĪMAT KUVALAYĀNANDA

(J. G. GUṆE)

October, 1925
Second Impression

Vol. I No. 4

KAIVALYADHĀMA

Post—LONAVLA

(BOMBAY-INDIA)

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ओ३म्

पुस्तक संख्या.....

पञ्जिका संख्या.....

पुस्तक पर सर्व प्रकार की निशानियां लगाना वर्जित है। कोई सज्जन पन्द्रह दिन से अधिक देर तक पुस्तक अपने पास नहीं रख सकते। अधिक देर तक रखने के लिये पुनः आज्ञा प्राप्त करनी चाहिये।

सर्वं खल्विदं ब्रह्म।
All this is, indeed, Brahman.

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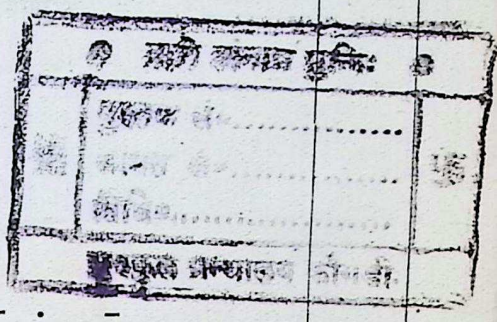
तदेकोऽवशिष्टः शिवः केवलोऽहम् ।
I alone persist: Blissful: Absolute.

ॐ

सोऽहम् ।



Yoga=Mimansa

EDITED BY

S'RIMAT KUVALAYANANDA

(J. G. Gune)

October, 1925
Second Impression

Vol. I No. 4

KAIVALYADHAMA

Post–Lonavla

(Bombay-India)

सर्वं खल्विदं ब्रह्म ।
All this is, indeed, Brahman.

नेह नानास्ति किञ्चन ।
There is nothing here apart from it.

शरीरमाद्यं खलु धर्मसाधनम् ।
Surely Health is the primary requisite of spiritual life.

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ॐ

तदेकोऽवशिष्टः शिवः केवलोऽहम् ।

सोऽहम् ।

YOGA-MĪMĀṄSĀ

VOL. I OCTOBER, 1925 NO. 4

Editorial Notes

MAY the Maker of all make this journal a success. Blessed is the name of the Lord. May He bless the workers of the Āśrama with a happy and prosperous career as servants of the world which is only the Lord Himself objectified. May He, that has created us in His infinite wisdom, lead us to the light that is beyond all darkness.

❁ ❁ ❁

IT fills us with great joy and a sense of satisfaction to present to our readers the fourth number of this volume; because it frees us from the responsibility that we undertook at the beginning of the first year. To many the work to which we have addressed ourselves may look simple but to us it threatens to be so seriously difficult that we are afraid we are proving unequal to the task at every step. Had it not been for our adamantine faith in the fatherly guidance of the all Merciful Lord and the motherly blessings of our ever unfailing Master, the little success we have achieved would have become impossible. We feel their living touch in whatever we undertake and it is this touch that is really enabling us to make our way through thick and thin! And what can we say about the parental care of our teacher, Prof. Maṇikrao? It was he who taught us to work with a heart for any fate; and it was at his feet that we learnt to labour and to wait!

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But we have not laboured in vain. We are more than satisfied with the success that has attended our work throughout last year. Ever since we advertised our journal, the subscribers' list has been steadily growing. Though we are spending very little on advertisement and though the economic condition of the country is far from satisfactory, we are getting a good response from our readers. Orders are being registered from every part of India. We have our subscribers in almost all the big cities of the country. That ninety-five per cent of our readers are educated men with university career is the most gratifying feature of our activity. Some of the leading libraries and prominent universities in India also subscribe to our journal. Looking to the rate with which we are developing our work, we feel sure that our journal will soon compare favourably with many of the well established Indian magazines at least so far as its circulation is concerned.

❁ ❁ ❁

We are not slow in receiving attention from the foreign countries also. Business-men from many a Western country have approached us for being entrusted with our work as agents. We hope to publish in our next issue the names of some of these gentlemen. When these agents are appointed, we expect to widen the circle of our foreign readers. Even to-day, without the services of any agents and without any advertisement whatsoever, we are receiving orders from the West. With great pleasure and satisfaction, we record our sense of gratitude towards our readers, both Indian and foreign, for the patronage they are giving to the Yoga-Mīmāṅsā.

❁ ❁ ❁

This expression of satisfaction at what is being done even to-day, should not lead our readers to suppose that our enterprise has financially been a success. Much more is required to be done even before we can make the two ends meet. The cost of printing and publishing the journal is comparatively far less than the cost of collecting the material for editing the journal. We are quite conscious of the fact that a research journal can

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never be made to pay the money necessary for maintaining a research institute. But at the same time we think we can rightfully expect the periodical to defray all the expenses that are incurred in getting the researches ready for publication. But even this much we shall not be doing unless we double the number of our subscribers. We have, therefore, to request our present readers not only not to discontinue their patronage, but also to get their friends interested in the work and thus to lend us a helping hand.

We are conscious of our shortcomings. But we hope our readers will not grudge their patronage for the next year simply looking to these drawbacks. If we are given better opportunities, we promise we shall never fail to serve humanity better.

❁ ❁ ❁

As regards the matter that has appeared in the first volume of the Yoga-Mīmāṅsā, we are glad to see that we have been able to keep a balance between the Scientific and Semi-Scientific Sections. In the Scientific Section we have shown that experimental evidence was necessary to understand and substantiate the discussion given in the Semi-Scientific Section. The number of pages devoted to each section could not be uniform in each issue; but this became inevitable owing to the character of the subject. We have tried to close our article on the Cecal Constipation. Though this article was mainly intended to deal with this type of constipation, we thought it desirable to give information on constipation in general and thus treat, in one place, the main disorder of the large bowel. Some important diseases of the colon still remain to be discussed. This we shall do in the subsequent issues and then we shall proceed to see how Yogic treatment can cure ailments of the stomach and the small intestine.

❁ ❁ ❁

The Popular Section has proved of great interest to the bulk of our readers. The poses described in this section are the most important from every point of view; and though we have not

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given their physiological effects, the technique given is quite sufficient to enable people to practise them correctly. In spite of our wish to make every volume independent, at least so far as articles are concerned, we have found it impossible to finish our article on the Pan-Physical Pose within the limits of the first volume. Much interesting and instructive information will appear on this Āsana in the next volume.

❁ ❁ ❁

We have already stated in the first issue that the scientific notes will not be repeated. This procedure we are going to follow in the next volume. So it is necessary for the intending subscribers to have with them the first volume for reference. It is for the convenience of these new subscribers that the first volume will be sold at its original price up to the end of January next. For economic considerations it has become unavoidable to fix for it a higher price afterwards.

❁ ❁ ❁

But we are not going to compel the new subscribers of every succeeding year to buy the back volumes. We have arranged to make the first two volumes a unit. For the new subscribers coming in during and after the third year, a companion volume will be published at a moderate price. This volume will contain all the scientific notes of the first two volumes. Again the articles will be arranged in such a way that a reference to back numbers will not be necessary for their understanding. This, however, should not be interpreted to mean that we are thinking of repeating stale matter in the third and subsequent volumes. We promise to give original information throughout our career. We shall repeat only that much of the old information as would be deemed necessary for making the new researches readily intelligible. So our readers need not be harassed by the dilemma of either subscribing for the Yoga-Mīmāṅsā from the very beginning or not subscribing to it at all. Those, however, that want to study seriously the modern interpretation of our Yoga-S'āstra,

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will do well to stock up all the volumes of the journal as they will be published.

❁ ❁ ❁

Our research work is being more and more appreciated by scholars of high order. We have been publishing personal appreciations and press notices in the successive issues of this journal. We have received suggestions from France and America to start branches of the Āśrama in those countries for the benefit of their people. Though it is too early for us to think of any such activity, we could note, with no small degree of satisfaction, the impression our work is making in the West. In India we are getting ample intellectual appreciation at the hands of the elite. We offer our hearty thanks to all who value our humble work.

❁ ❁ ❁

The sympathy of the editorial world is simply overwhelming. Our free exchange list is being enriched, month to month, by the addition of very valuable periodicals. We cannot but record our warmest gratitude for all the kind souls that are doing us this honour.

❁ ❁ ❁

Our therapeutical work is prospering. Perhaps it has become one of the most attractive features of the Āśrama. People from distant parts of our country come to the Āśrama, seeking relief against disorders that continued to worry them for years defying every treatment! We are glad to state that by the grace of the Lord almost all of them find an amount of relief. Of course there is also a small minority of patients who run away from us at the very commencement of our treatment! We only wish that even this minority should not be there; but so long as human nature continues to be what it is our wish will ever remain a wish.

❁ ❁ ❁

As announced in the previous issue we have now set up our Āśrama in two separate homes. One is entirely reserved for students and the other for patients, guests and others.

❁ ❁ ❁

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EVERY one in India knows Sir Prabhāshaṅkara Pattaṇi of Bhavnagar, his broad sympathies for everything undertaken in the service of humanity, and his liberal heart that encourages all selfless work. It is due to the kindness of this worthy son of India that we could get a snug and comfortable home for our students. He owns a beautiful estate on the Bombay–Poona Road here in Lonavla, and has granted us, with his characteristic kindness, a free use of it. Now our students can practise their exercises and meditations unmolested, and can build an atmosphere vibrating with spiritual forces! We have named this home as Pātan'jala-Vihāra, thus combining the Yogic ideals of ancient Hinduism and its offshoots. Our readers will find a picture of this Pātan'jala-Vihāra opposite to this page. We beg to offer our respectful thanks to our worthy benefactor.

❁ ❁ ❁

In the last issue we made a mention of the facilities we are being given in our X-Ray work by Dr. Chandrachūd, the Chief Medical Officer and Dr. Bhatta, the X-Ray expert of Baroda. It is at the recommendation of the former and with the sympathy of the latter, that our Āśrama is now allowed by the Baroda Government to do our X-Ray work almost gratis. The concession is just in keeping with the high traditions of H. H. the Gaiekwar's progressive rule and the widely known sympathies of the present Diwansaheb. We record our sense of gratitude to all the parties concerned in granting us this concession. The Commissioner of Education of the Baroda State also deserves hearty thanks for recommending our journal to the educational institutions under his care.

❁ ❁ ❁

OUR thanks are also due to S'rīmat R. A. S'āstrī, a well-known manuscript scholar. In his able work on Lalita Sahasranāma, a book of Mantra-S'āstra, he has made a special reference to the work we are doing in the field of Yoga; and has undertaken to find for us rare manuscripts of Yogic literature.

❁ ❁ ❁

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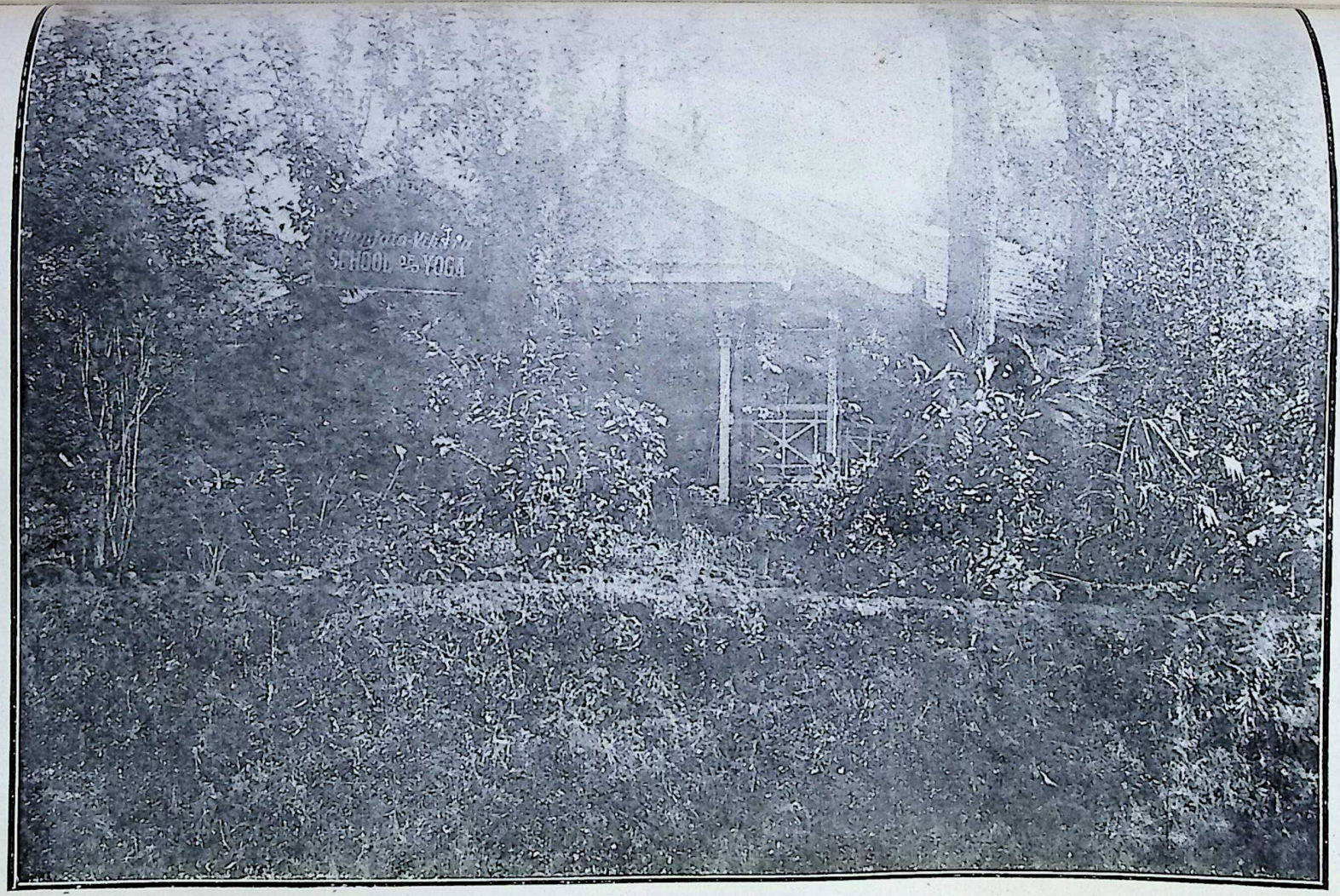

Pātan'jala-Vihāra: School of Yoga Quarters.

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Two small pamphlets that were published before starting our journal have been reprinted in the last section. Our readers will be interested to go through this part of the present issue, as it will show them how the Āśrama came into existence and under what circumstances this journal was started.

ॐ ॐ ॐ

May the Lord that enabled us to found the Āśrama, give us strength enough to carry on its work! May He ever widen the circle of our sympathizers and thus allow us to serve Him and His children to the best of our ability!

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The Scientific Section

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SYSTEM OF TRANSLITERATION

Letters, their sounds, and a description of these sounds:—

अ	A	Pronounce	'A'	like	'u'	in	'but'.
आ	Ā	,,	'Ā'	,,	'a'	,,	'far'.
इ	I	,,	'I'	,,	'i'	,,	'pin'.
ई	Ī	,,	'Ī'	,,	'ee'	,,	'feel'.
उ	U	,,	'U'	,,	'u'	,,	'fulsome'.
ऊ	Ū	,,	'Ū'	,,	'oo'	,,	'wool'.
ऋ	Ṛi	,,	'Ṛi'	,,	'rö'	,,	German.
ॠ	Ṝi	,,	'Ṝi'	,,	,,	,,	,, with a strong accent.
ऌ	Ḷi	,,	'Ḷi'	,,	'lö'	,,	German.
ए	E	,,	'E'	,,	'a'	,,	'fate'.
ऐ	AĪ	,,	'AĪ'	,,	'ai'	,,	'aisle' but not drawled out.
ओ	O	,,	'O'	,,	'o'	,,	'over'.
औ	AU	,,	'AU'	,,	'ou'	,,	'ounce' but not drawled out.
क	KA	,,	'K'	,,	'k'	,,	'kill'.
ख	KHA	,,	'KH'	,,	'kh'	,,	'ink-horn' or like 'ch' in 'Loch' (Scottish).
ग	GA	,,	'G'	,,	'g'	,,	'girl'.
घ	GHA	,,	'GH'	,,	'gh'	,,	'log-house' or 'ghee'.
ङ	ṄA	,,	'Ṅ'	,,	'n'	,,	'king' or 'link'.
च	CHA	,,	'CH'	,,	'ch'	,,	'church'.
छ	CHHA	,,	'CHH'	,,	the second 'ch' in 'churchill'.		
ज	JA	,,	'J'	,,	'j'	in	'join'.
झ	JHA	,,	'JH'	,,	palatal 'z' as in 'azure'.		
ञ	N'A	,,	'N''	,,	'n' in 'pinch'.		
ट	ṬA	,,	'Ṭ'	,,	't'	,,	'tub'.
ठ	ṬHA	,,	'Ṭh'	,,	'th'	,,	'pot-house'.

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SYSTEM OF TRANSLITERATION

Letters, their sounds, and a description of these sounds :—

ड	DA	Pronounce 'D'	like 'd'	in 'dog'.
ढ	DHA	,, 'DH'	,, 'dh'	,, 'mad-house.'
ण	NA	,, 'N'	,, 'n'	,, 'splinter' or 'and'.
त	TA	,, 'T'	,, dental 't' as in 'thin', or like the French 'T'.	
थ	THA	,, 'TH'	,, 'th' in 'thunder'.	
द	DA	,, 'D'	,, 'th'	,, 'then'.
ध	DHA	,, 'DH'	,, 'th'	,, 'this'.
न	NA	,, 'N'	,, 'n'	,, 'no'.
प	PA	,, 'P'	,, 'p'	,, 'paw'.
फ	PHA	,, 'PH'	,, 'ph'	,, 'top-heavy', or 'gh' in 'laugh'.
ब	BA	,, 'B'	,, 'b'	,, 'balm'.
भ	BHA	,, 'BH'	,, 'bh'	,, 'hob-house'.
म	MA	,, 'M'	,, 'm'	,, 'mat'.
य	YA	,, 'Y'	,, 'y'	,, 'yawn'.
र	RA	,, 'R'	,, 'r'	,, 'rub'.
ल	LA	,, 'L'	,, 'l'	,, 'lo'.
व	VA	,, 'V'	,, 'w'	,, 'wane'.
श	S'A	,, 'S''	,, 'sh'	,, 'ashes'.
ष	SHA	,, 'SH'	,, a strong lingual with rounded lips.	
स	SA	,, 'S'	,, 's'	in 'sun'.
ह	HA	,, 'H'	,, 'h'	,, 'hum'.
ळ	LA	A dento-lingual pronounced with a little rounding of lips.		

Visarga—H; Nasalized म् as in संयम—ṁ;

Nasalized न् as in मीमांसा—ṅ.

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X-RAY EXPERIMENTS ON UDDIYĀNA

(Continued)

EXPERIMENT IV[1]

NOTE—

Here no fresh experiment was tried but the second experiment on Nauli given in the last issue, (p. 168) is referred to here as the fourth experiment on Uḍḍiyāna. As the same subject with the same injection was taken up for the next experiment on Uḍḍiyāna directly after the fifth experiment on Nauli stated on p. 182, of this volume, was tried, we are in a position to draw valid conclusions by comparing and contrasting Radiographs V and X. We do not repeat the details of this experiment here, but we reproduce Radiograph V as Radiograph IX for ready reference.

1 The third experiment has appeared on p. 86 of the current volume.

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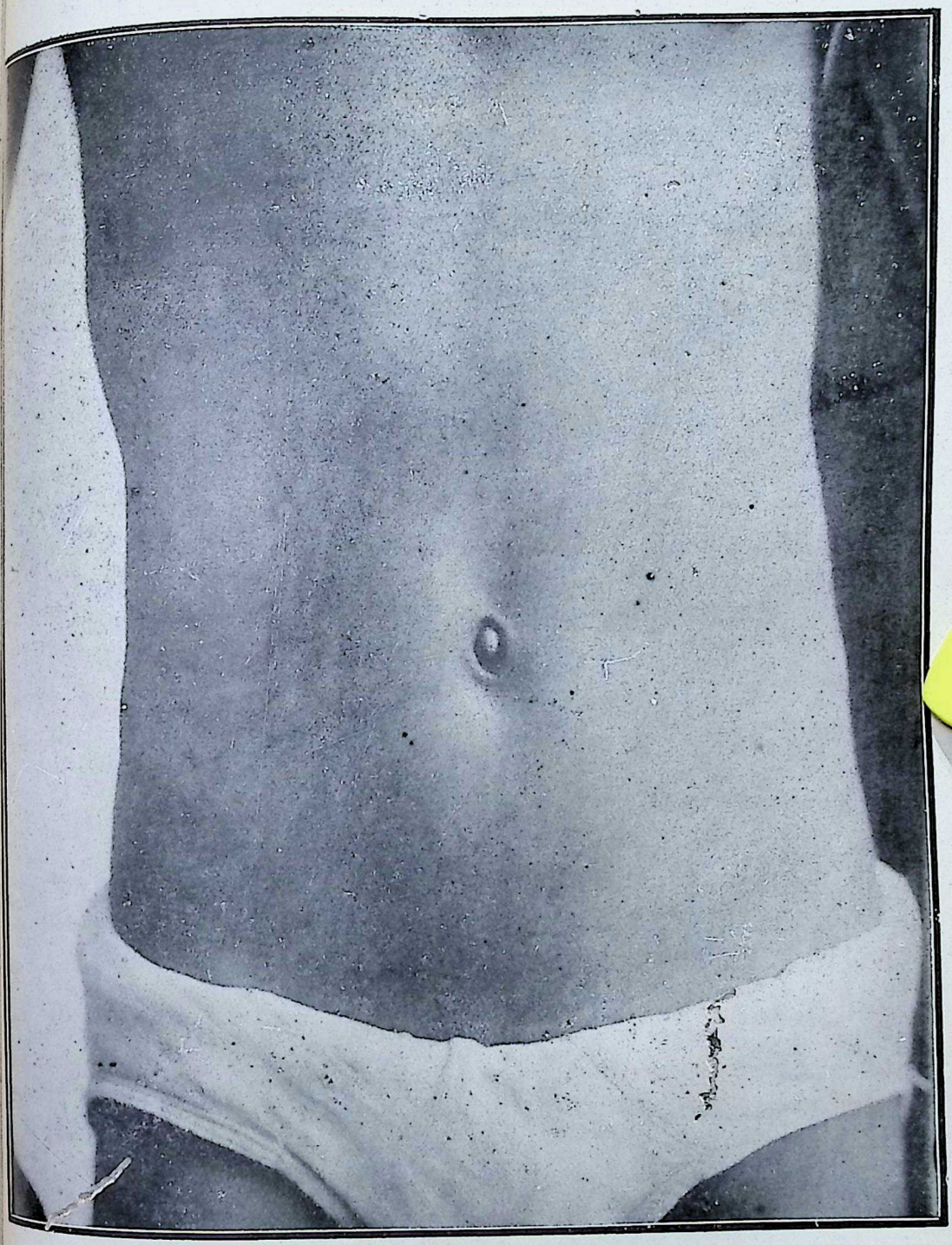
Fig. LXXXI



Normal Abdomen
(External View)

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Fig. LXXXII *Radiograph IX*

Normal Position of the Colon and its Contents
when loaded with
One Pint Opaque Injection.

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REFERENCES TO RADIOGRAPH IX

1 The Iliac Bones.
2 The Sacrum.
3 The Tenth Ribs.
4 The Eleventh Ribs.
5 The Twelfth Ribs.
6_{11} The Eleventh Dorsal.
6_{12} The Twelfth Dorsal.
7_1 The First Lumbar.
7_2, 7_3, 7_4, 7_5 The Successive Lumbar Vertebræ upto the Fifth.
8 The Cecum.
9 The Ileo-cecal Valve.
10 The Ascending Colon.
11 The Hepatic Flexure.
12 The Transverse Colon.
13 The Splenic Flexure.
14 The Descending Colon.
15 The Iliac Colon.
16 The Rectum.
17 The Transverse Processes.

NOTE—

The bold and black R and 4 have no bearing on the present scheme of references.

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EXPERIMENT V

OBJECTS OF THE EXPERIMENT:—

One of the objects of the experiment was to see whether or not the exercise of Uḍḍiyāna was capable of effacing the loop at the splenic flexure as seen in Radiograph IX. Another object was to observe the position of the cecum when Uḍḍiyāna was not done with full force, but a gentle pressure was applied to the hypo-gastric and iliac regions.[1] The third object of the experiment was to note changes in the position of the remaining parts of the colon.

PREPARATION OF THE SUBJECT:—

As the subject was taken up for this experiment just as he was prepared for the second experiment on Nauli described in the last issue, (p. 168), this heading does not require separate elaboration.

THE EXPERIMENT PROPER:—

Uḍḍiyāna was illustrated in the first number in Figs. III to VI and is illustrated in this number in Fig. LXXXIII. The subject was not made to assume, however, any of the positions shown in these figures; but he practised Uḍḍiyāna for the purpose of this experiment just as he did in Experiment II, (p. 20) of the first number, the only difference between this Uḍḍiyāna and the last being that the pressure applied to the lower abdominal region in the present case was weaker than the previous pressure.

NOTE—

Radiograph X was orginally 12″ × 10″. It is reduced to the present size for the convenience of this journal.

1 The abdomen is divided into nine regions anatomically. Without discussing the details of the scheme according to which this is done, we simply give a diagram (Fig. LXXXIV), indicating the different regions. These regions include the viscera underlying them.

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Fig. LXXXIII

Uḍḍiyāna.

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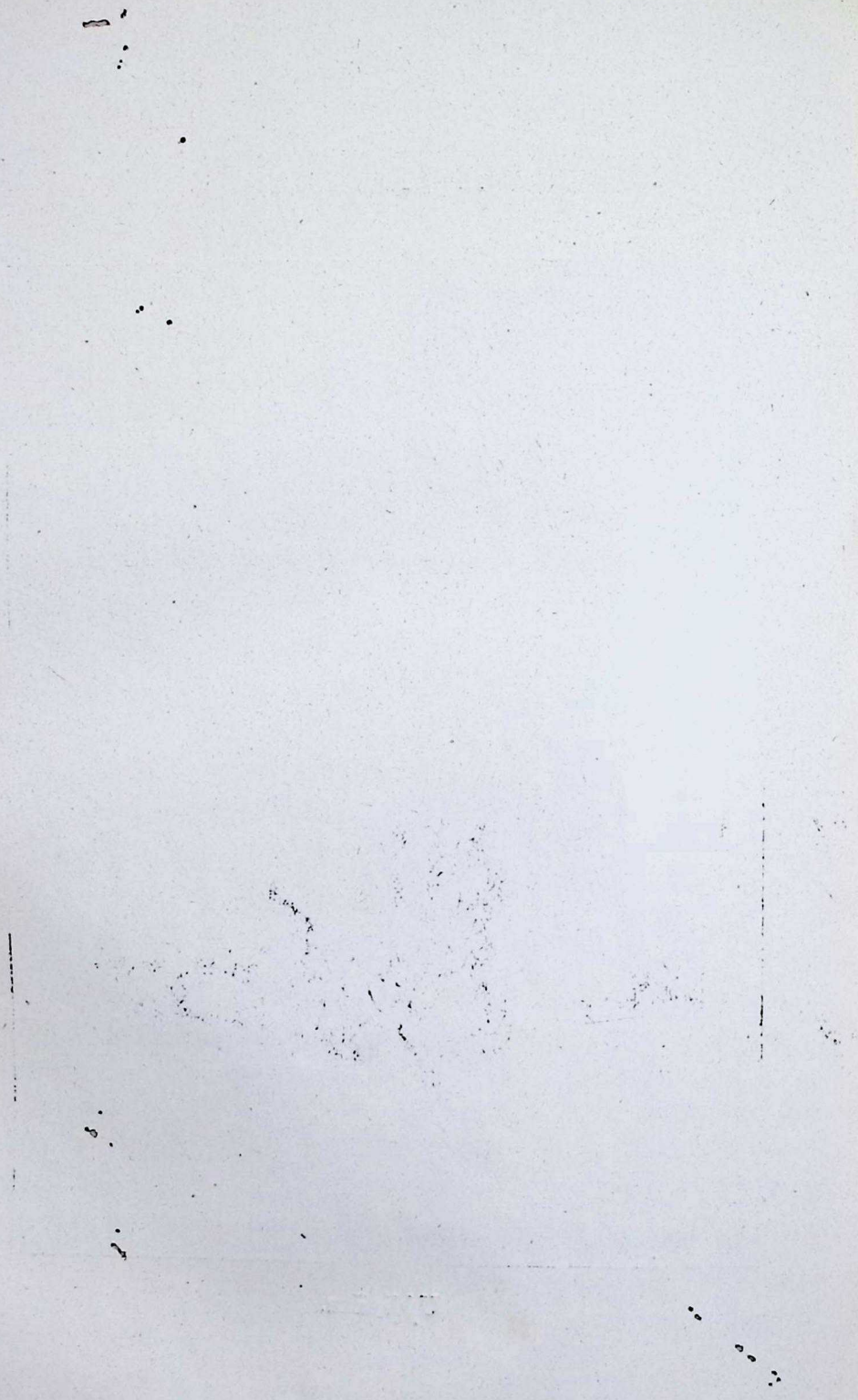

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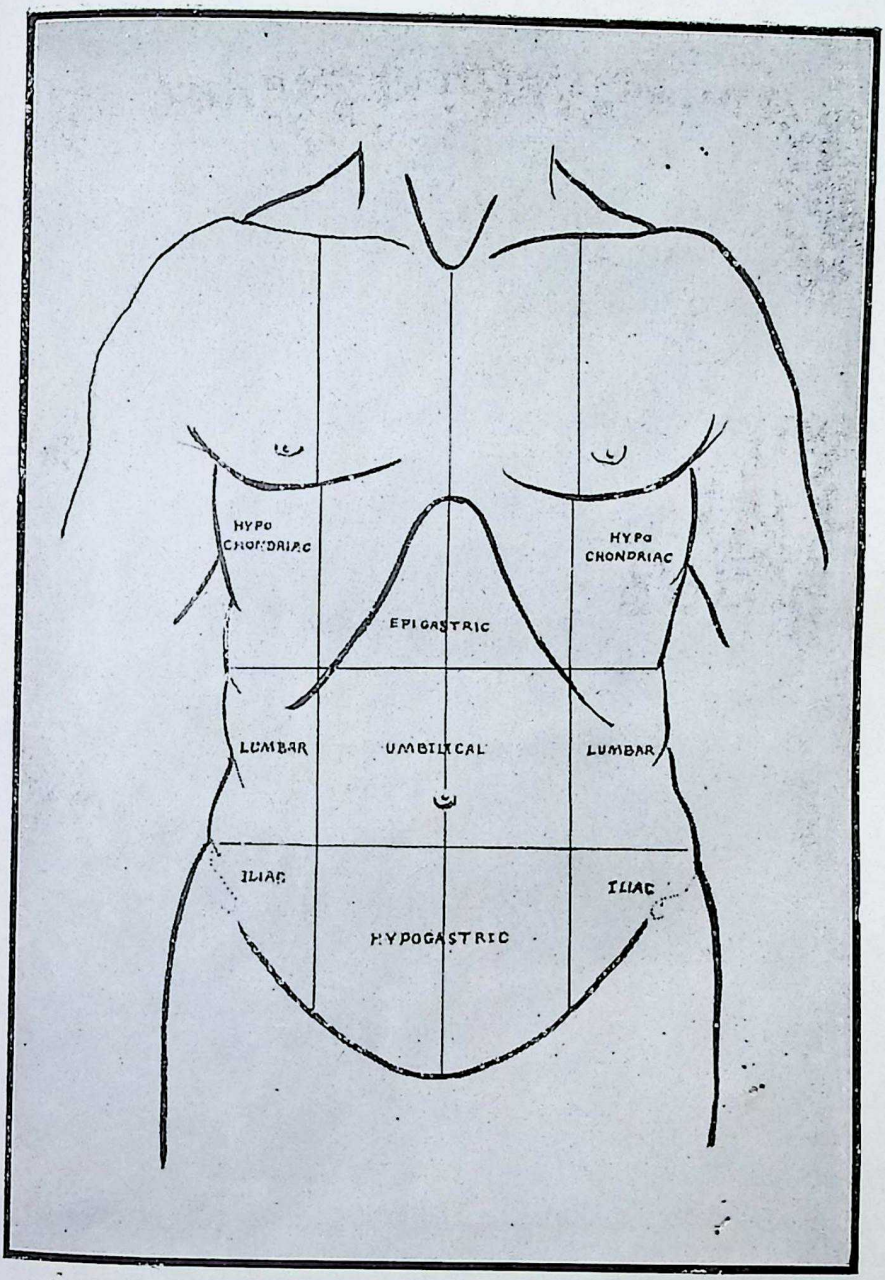
Fig. LXXXIV



Nine Regions of the Abdomen.

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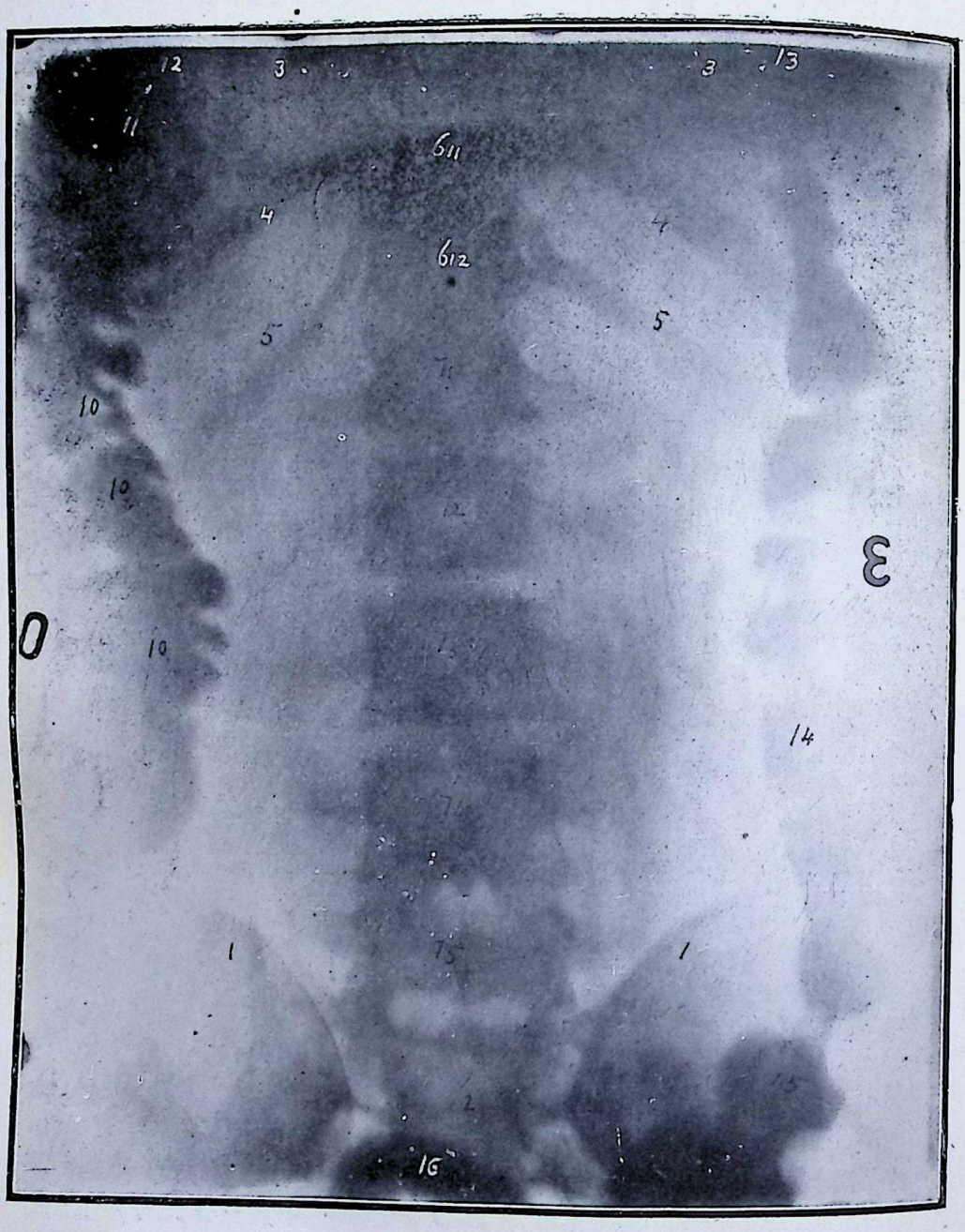
Fig. LXXXV *Radiograph X*



Position of the Colon and its Contents
during
Uḍḍiyāna.

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REFERENCES TO RADIOGRAPH X

1 The Iliac Bones.
2 The Sacrum.
3 The Tenth Ribs.
4 The Eleventh Ribs.
5 The Twelfth Ribs.
6_{11} The Eleventh Dorsal.
6_{12} The Twelfth Dorsal.
7_1 The First Lumbar.
7_2, 7_3, 7_4, 7_5 The Successive Lumbar Vertebræ upto the Fifth.
8 The Cecum.
9 The Ileo-cecal Valve.
10 The Ascending Colon.
11 The Hepatic Flexure.
12 The Transverse Colon.
13 The Splenic Flexure.
14 The Descending Colon.
15 The Iliac Colon.
16 The Rectum.
17 Umbilicus.

NOTE—

The bold and black **0** on the right side of the figure and similar but inverted **3** on the left, have nothing to do with the present scheme of references.

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POINTS OF STUDY :—

1 — (a) In Radiograph IX the cecum was hanging as low as the lower border of the fifth lumbar, whereas in this radiograph it is raised almost up to the middle of the fourth lumbar.

(b) The slight pressure applied to the lower abdomen has not been able to empty the cecum of its contents.

2 — (a) The angle at the hepatic flexure was slightly less than a right angle in Radiograph IX; but here it is altogether effaced and a good round curve has taken its place.

(b) In Radiograph X the hepatic flexure throws darker shadows than in IX and indicates greater concentration of the contents.

3 — (a) In Radiograph IX the transverse colon crosses the spine in front of the twelfth dorsal; whereas here it appears to cross the vertebral column somewhere above the tenth dorsal.

(b) The thicker shadows of the transverse colon in Radiograph X suggest larger accumulation of the injection in this part of the colon.

4 — (a) Radiograph IX recorded a loop at the splenic flexure. That loop has totally disappeared in Radiograph X.

(b) The narrow shadows of the splenic flexure indicate that this part is comparatively empty.

NOTE—

A comparison of Radiographs IX and X will reveal many more points of study. We have noted only those that were of striking importance.

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The Semi-Scientific Section

पुस्तकालय
गुरुकुल कांगड़ी

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CECAL CONSTIPATION

PART II

(Concluded)

In the first part of this article which appeared in the first number of this journal, we passed under rapid survey, the dangerous character of cecal constipation and the curative measures proposed by the modern civilized world to combat this disorder. In the second part which appeared in the second number we discussed the causes of constipation; and after a detailed study, we saw that the Yogic exercises of Uḍḍiyāna and Nauli were unparalleled in strengthening the abdominal muscles and thus removing one of the causes of this dangerous ailment. In the third issue we took notice of the degeneration of nervous and muscular control of the colon wall which was shown to be the second cause of constipation. In the present issue we want to see what remedies are suggested by the modern world to fight out this second cause and also to compare these with those available for this purpose in ancient Yoga and learn their comparative merits.

It will be readily admitted, however, that the adoption of any measures is bound to be useless, unless the patient tries to avoid creating fresh occasions to get his colon out of order. In tracing out the causes of the degeneration of the colon wall, we found that suppression of the nature's call was mainly responsible for this result. So what is necessary as the first step in the treatment of constipation is to pay prompt attention to this call and never to neglect its claim. The suppressed call stores up fecal matter in the rectum which leads to worst stages of constipation. So even the smallest tendency on the part of the colon to move, should be attended to and no violence practised against it. Nay, there is something more to be done in this regard. Old men, in India are often found advising their youngsters to go to privy regularly morning and evening even when they do not get a call

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at these hours. For some days their visit appears to be a waste of time; but slowly mental inclination begins to express itself as physical and the bowels appear to take a hint and move. We have ourselves seen many people benefited by this simple contrivance. We Indians may be branded as uncivilized by our cultured modern brother of the West; but he has many things to learn from us; and our bowel habits is a lesson which, if learnt by him, will make him far more happy than he is to-day.

Many people are in the habit of getting a call for evacuation directly after their meal. This is somewhat natural in the case of constipated persons. Modern physiology has come to the conclusion that anything introduced into the stomach sets up peristalsis all over the food tube. So the action of the meal naturally moves the bowels. It is not desirable that all persons especially the youngsters should stand in need of even this much stimulus for their bowel movement.

This vigilance on the part of our elders had kept us *almost* free from this dangerous disorder of constipation, till the modern civilization came bringing in its train the dreaded disease. Whatever the history of the rise of constipation in India, we have to acknowledge that many of us are thoroughly under the grip of this relentless foe, and that we have to sit down and soberly think of the most successful ways of withstanding its attacks.

Where the disease is well advanced, mere regulation of the calls will not help to solve the problem. Cases in which nervous and muscular control of the colon wall is to be regenerated, require better measures.

In India electric treatment is so expensive and so rarely available that not even one in one thousand of the vast constipated population can take advantage of it!

Next comes the turn of massage and exercises. In considering the efficacy of these measures we have to remember the following facts. The colon wall consists of involuntary muscles. These muscles are not under the control of our will and hence cannot be con-

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tracted or relaxed as we choose. When we remember this involuntary character of the colon muscles, we can easily see that massage or exercise can help the bowel contents to move only by pressure applied to the colon wall. It was quite another thing with the abdominal muscles. Their contraction and relaxation depended upon our volition and hence they could be exercised as we wished.

Let us take an illustration to make our problem clear. Suppose there is a rubber tube five feet in length, having a bore of two inches and a half and having one of its ends closed. Suppose again that it is filled with a semi-solid substance. Now if the tube has power to contract and thus reduce its bore and capacity, the contents will be pushed out of its open mouth when it would contract. But if the tube cannot contract of itself and if the contents are to be taken out, a pressure from outside will be necessary. Somebody will have to squeeze it and thus force out the contents.

Now that is what exactly happens in the case of the colon. In conditions of health, it has power to contract of itself; but in a degenerated condition, it loses this power and requires some external help, if the contents are to be thrown out. It is the purpose of massage and exercise to exert this pressure.

This being the case, we can see that, if the colon contents are to be pushed ahead we must bring such pressure to bear upon the colon as would gradually move along its wall, bit by bit, emptying the parts to which it is applied. We want those exercises especially that would clear the cecum of its foul contents. Now out of the non-Yogic exercises, whether Eastern or Western there is not a single exercise, so far as we know, that has the power of emptying this part of the large bowel. It is only the Yogic exercises of Uḍḍiyāna and Nauli that can empty this pouch. Nay they can do much more. They can move the contents of the whole colon backward and forward; and ultimately huddle them up in the descending colon and the pelvic loop! Massage done by a really good masseur may accomplish much in

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this regard; but we seriously doubt whether even the best of them can really shuffle the bowel contents as delicately and yet effectively as is done in Nauli.

The real usefulness of exercise and massage, however, does not lie in the mechanical pressure they exert upon the bowels. We have seen that the intestinal movement mainly depends upon the impulses set up by the plexus of Auerbach. Now the kneading and squeezing brought about by massage and exercise is able to start these impulses, thus moving the bowels to action. It it this effect of the massage and exercise that really counts.

Here too it will be found that the exercise of Nauli has no parallel. What we have said about Nauli in the case of abdominal muscles holds good about it in regard to colon wall also. If we examine the radiographic evidence before us we find that the cecum and the whole ascending colon can be raised. The transverse colon is moved upwards and downwards through the largest space available in the abdomen. The rectum, the descending colon may be shaken, so also the pelvic loop. The rectum, the degeneration of which has been found to lead to so much trouble, may be broadened and narrowed at will. The anal sphincters can be forced open, a result no other exercise in the world can produce! Thus we find that every fibre of the bowel wall is moved! The effect is obvious. These movements exercise the plexus of Auerbach and a very powerful peristalsis is set up. We have seen under X-Ray that in healthy persons these Yogic exercises are able to accomplish movement in one-tenth of the time required in the ordinary course of things.[1]

We admit that in constipated persons where the nervous and muscular control is degenerated, when these Yogic exercises would not show these very results. But we want only to point out that, so far as we know, these exercises will stand superior to all others, if both of them are tried either upon healthy persons or unhealthy persons.

1 Radiographs bearing on this point will appear in the course of the next volume.

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Real regeneration of the colon wall depends upon the blood supply we are able to induce to its muscles and nerves. Now it is an admitted physiological fact that the more thorough an exercise is, the richer is the blood supply induced by it to the parts exercised. We have shown above that no other exercise is as thorough as Nauli and hence no other exercise can regenerate the colon as effectively as Nauli can.

But at times we come across cases where the whole colon is so much crusted, that even the exercise of Nauli would fail! The bowel needs thorough flushing!

Here too the Yogic Basti is far superior to modern enema. In the first number of this journal (p. 46), we have summarized the drawbacks of this Western appliance. We will not repeat them here; but would satisfy ourselves by picking out the most serious of them and by showing how the Yogic Basti does not only not suffer from them, but is a decidedly the reverse of it.

Take, for instance, the inability of the modern enema of *surely* reaching the cecum and consequently emptying it. We have already shown that the most dangerous type of constipation is cecal. If the cecum cannot be surely washed, the enema proves, thus far, to be defective. But in Yogic Basti the cecum can positively be flushed. Again modern enema only weakens the bowel, because the latter gets into the habit of yielding only under particular pressure. But the Yogic Basti combines flushing with the exercise of Nauli, without which it cannot be done, and thus strengthens the bowel. Again in Yogic Basti the original bowel contents, together with the new water sucked up, are pushed backward and forward so thoroughly that the whole colon is completely flushed, an advantage not to be found in the modern enema.

Thus we can go on multiplying the points of excellence in Yogic Basti. As we are not out here, however, to exhaust these points, but simply to note some of them that would show how Yogic Basti is superior to the modern enema, we close this discussion at this stage.

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In the second number of this journal (p. 116), we have seen that two causes are mainly responsible for constipation in general and cecal constipation in particular. (1) The weakness of the abdominal muscles. (2) The degeneration or absence of the normal nervous and muscular control of the colon wall.

In the same number we have shown that the Yogic exercises are the best for combating the first cause. Now in this issue we have proved the same thing in the case of the second cause.

Our impartial study and clinical experience have convinced us that the Yogic exercises of Uḍḍiyāna and Nauli are simply a boon to the constipated folks. As stated on pp. 212 and 213 of the current volume, there are cases which can be helped only by operative measures and we gladly recommend surgical treatment to them. So also on p. 46 we have acknowledged that the modern enema is a wonderful help in acute conditions of diseases. Barring these exceptional occasions constipated people will find a sure remedy in Yogic exercises.

Where for various reasons Uḍḍiyāna and Nauli cannot be undertaken to start with, other exercises may be tried; but the ultimate aim should be to pick up these infallible weapons that can positively fight out constipation.[1]

1 A couple of hints would not be inopportune here. These exercises should not be practised by boys before the age of puberty. Again when used as remedial measures, they should be helped by moderate dietic restrictions.

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The Popular Section

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N. B.—The Director of the Kaivalyadhāma entreats every man of means to show his active sympathy for the Ās'rama.

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A FEW FACTS ABOUT THE BLOOD

and

BLOOD CIRCULATION[1]

Everybody has seen the blood. As this note is not intended to be very comprehensive, we do not discuss here its chemical composition; but straightway proceed to describe its functions and the arrangements that have been made in the human body for its circulation.

FUNCTIONS OF THE BLOOD

The functions of the blood are to carry nourishment to every tissue and organ of the body. It may be compared to a stream flowing through a tract of country, and giving off branches in all directions, so that it waters every quarter of the district. We know that that tract of country is likely to be extremely fertile, and we know what a change would come over it if the river were dried up; or, if one branch only were suddenly cut off, we know what a contrast the part formerly supplied by that branch would present to the rest, still watered as before. Now for the tract of country substitute the human body, and for the stream, with its many branches to every part of the country, substitute the blood carried in channels (the blood-vessels—veins and arteries) to every portion of the body, and we have a very striking similarity. For the blood flowing through a part of the body as surely bathes the tissues beside which it flows as does a river water the fields along its banks. Thus the liver cells are situated in groups on the blood channels, which exist in such abundance in the liver. As the stream of blood flows past, they select from it what they need for their work, just as different trees and plants along the

[1] This note is chiefly a summary of the excellent articles on this subject contained in *The Household Physician* by J. M'Gregor-Robertson.

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bank of a stream will suck up what nourishment they need. The liver cells select from the blood the substances out of which they may manufacture the bile salts, the bile colouring matters, etc. It is the same blood that flows through the brain, and here it comes in contact with brain cells, whose function, connected with thinking, feeling, willing, etc., is very different from that of the liver cells. Nevertheless from the same blood they find nourishment for their life and the sources of their activities. They too select from it the substances they need and convert them into that which it is their business to produce, and which is something very different from bile salts and colouring matters. It is the same blood that flows through a muscle and bathes the muscular fibres. They also find in it the elements that are necessary for restoring exhausted muscle fibres and building up new ones. It is the same blood that flows through the tissues of the eye and maintains in health and power this most wonderful of optical instruments. In short just as in one garden you may have the lily and the rose near neighbours to strawberry beds and apple-trees growing from the same earth and having the same rain and sunshine from heaven, yet each one selecting from the common nourishment the elements it needs, and converting them into flower and fruit very different from one another so the blood in the human body contains nourishment for the liver cell and brain cell, muscular fibre and sentient organ, which each selects as its needs dictate.

While this is the main function of the blood, it serves that other purpose of carrying away, in its current, from the tissues substances, produced by their work, whose removal is necessary for the continuance of the healthy life of the part.

It is, then, quite clear how conditions of the blood speedily affect the body. Suppose the blood to be insufficient in quantity. Each tissue and organ gets a supply but not enough. Its vigour is, therefore, diminished and its efficiency impaired. If the blood be equally distributed, all parts of the body may suffer equally and general symptoms of ill-health, not symptoms pointing

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out definitely one suffering part, are the result. In some cases one organ may suffer more than another, may get less than its own share of the diminished supply, and alongside of the general symptoms, which point out the general condition, are others indicating some organ on which the privation is specially hard. The blood may, however, be sufficient in quantity but bad in quality. Some particular element may be wanting. For example, *scurvy* (diseased state of blood with swollen gums, livid spots, and prostration) is held to be due to absence from the food of some element, perhaps potash salts, perhaps citric acid, which fresh vegetables supply. Some substance may be present that ought not. For example, the liver may have failed to separate bile, and substances are left in the blood which being carried through the body, act directly or indirectly as a poison. Some material may also gain entrance by the food, or air, or in other ways, which vitiates the quality of the blood and impairs its value as a nourishing fluid. This will make evident how dependent the whole body is on the quality and quantity of the blood.

THE APPARATUS OF THE CIRCULATION

The blood being the source of nourishment of all the tissues of the body, its need of constant renewal is apparent; for, otherwise all nourishing material would speedily be abstracted from it. Moreover, tissues not only remove from the blood what they require, but they pour into it the waste products of their activity. If the blood were stagnant in the tissues it would thus not only be deprived of all nourishment, but would be loaded with waste and poisonous material. Therefore, as fresh blood must come constantly streaming to an organ or tissue, so must it as constantly flow away again, carrying impurities with it. The main idea of the circulation is thus easy to understand. There must be a central pump, so to speak, from which large pipes, to continue the illustration, pass off, leading to smaller and smaller pipes distributed throughout the whole body. The blood must be pumped into the large pipes and forced along till it reaches the smallest branches, so that it may have access to the remotest parts. There

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must also be a second system of pipes, by means of which the blood, after nourishing the tissues and being laden with their waste products, is brought back again to the central pump to be again distributed. Somewhere in this circuit there must be means for purifying the blood from the waste products it has received. Now this central pump is the *heart*, and the pipes leading from it and passing into smaller and smaller branches are the *arteries*, the fine vessels into which they ultimately pass being called the *capillaries*, while the pipes along which the blood is brought back to the heart are the *veins*. The purifying arrangements are made in the lungs. Of course there can be no break in the continuity between the arteries and veins. The arteries beginning large at the heart, become smaller and more numerous till they end in the fine hair-like capillaries; and then the reverse process must go on, the blood passing, on its return journey, from smaller to larger vessels till the large veins are reached which open into the heart. So that the arteries *end* in the tissues in fine, hair-like vessels—capillaries, and the veins *begin* in the tissues in fine, hair-like vessels—capillaries and they must be mutually continuous, so that the capillaries of the arteries pass insensibly into capillaries of veins. Heart, arteries, capillaries, and veins form the apparatus of the circulation, and we must understand the apparatus before we proceed to examine the process of the circulation itself.

THE HEART—The heart is a hollow organ made of muscle, whose fibres resemble partly those of voluntary muscles, and partly of involuntary. (Vide pp. 195–196 of the current volume). It is situated in the chest and mostly lies on the left side of it. If the hand be laid flat on the chest over the region of the left nipple, beats will be felt an inch below and a little to the right of this nipple. This spot marks the left limit of the heart represented by its apex. From this point the heart stretches beyond the breast-bone till it stands a little to the right of it. The heart as a whole stands between the right and the left lungs. (Vide Fig. LXXXVI).

Fig. LXXXVI

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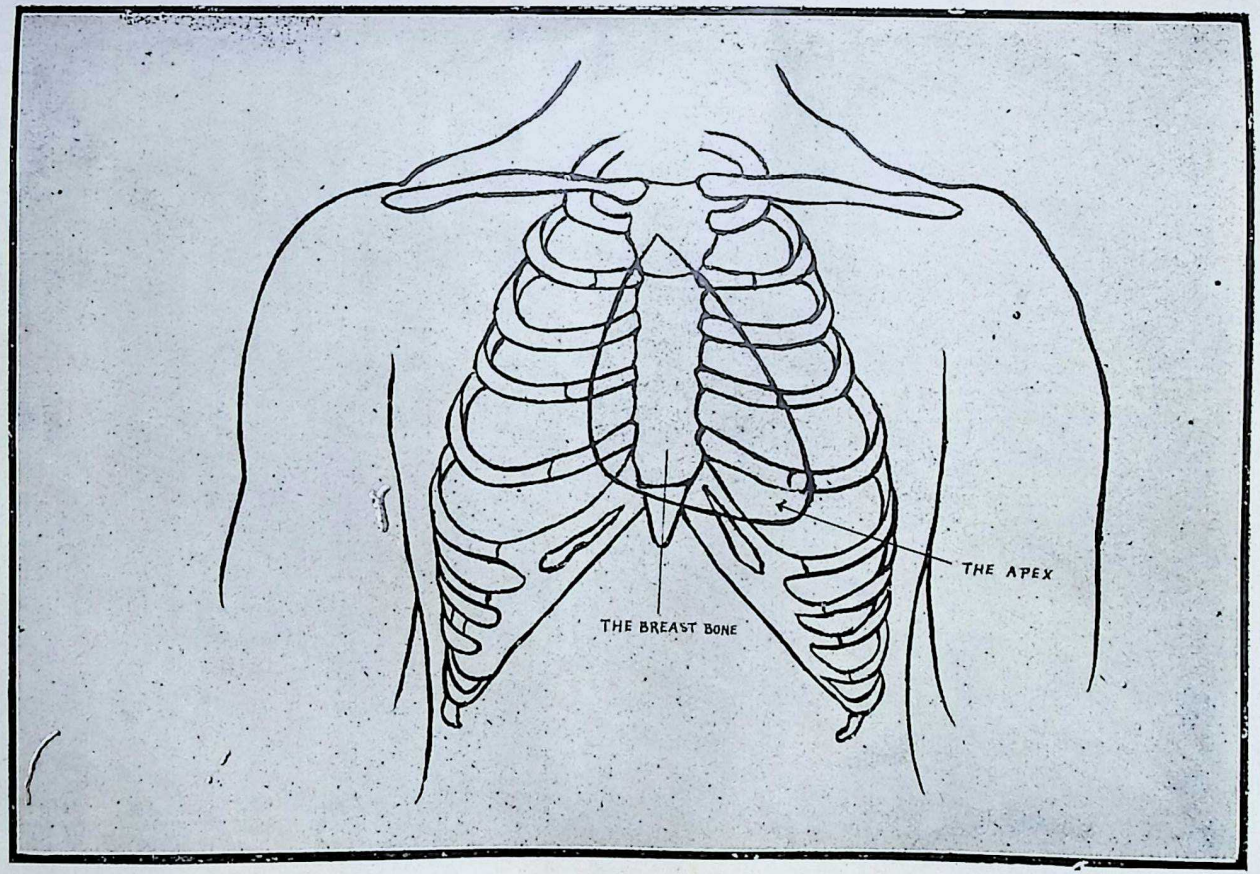
Fig. LXXXVI



Position of the Heart in the Chest.
(The conical figure represents the heart)

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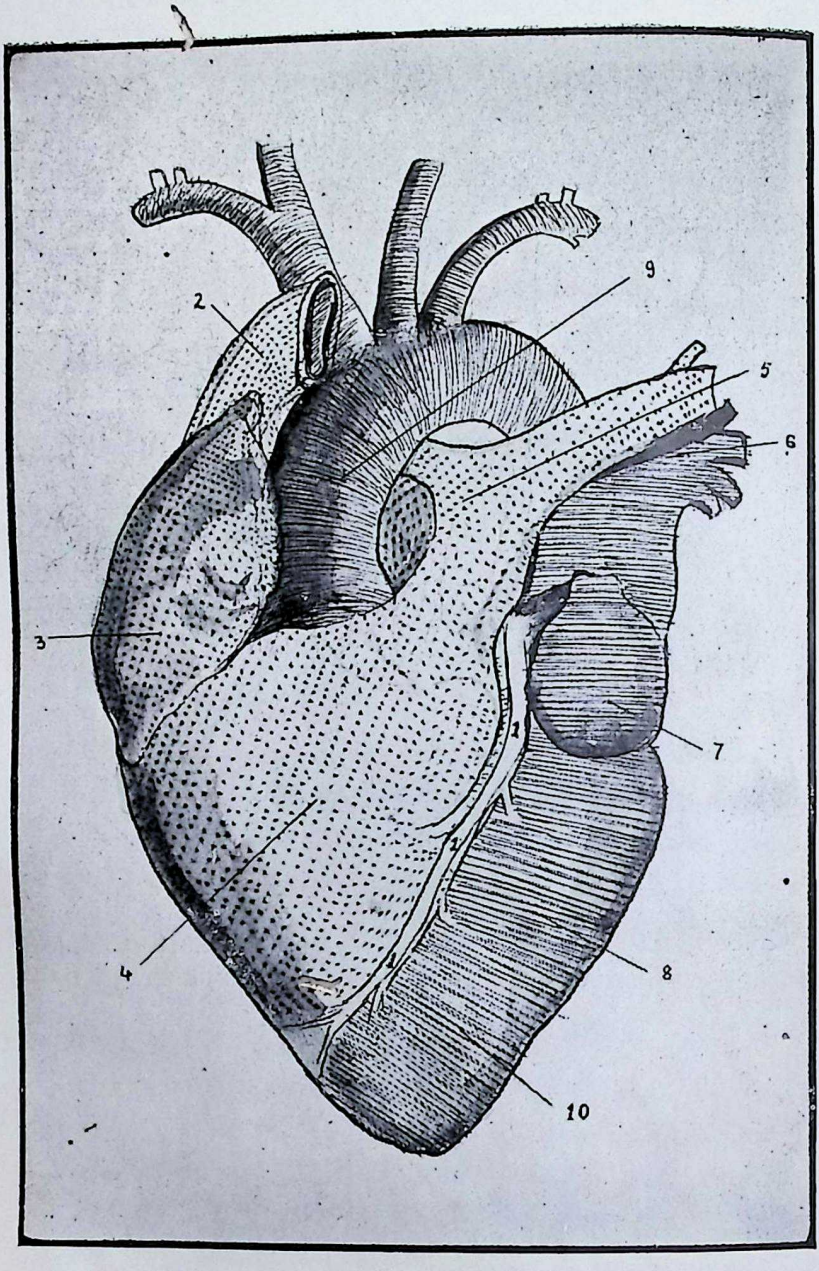
Fig. LXXXVII



The Heart.

1 The Groove indicating the Septum.
2 The Superior Vena Cava.
3 The Right Auricle.
4 The Right Ventricle.
5 The Pulmonary Artery.
6 The Pulmonary Vein.
7 The Left Auricle.
8 The Left Ventricle.
9 The Aorta.
10 The Apex.

N. B.—In the above chart parts containing pure blood are marked with lines, whereas parts containing impure blood are marked with dots.

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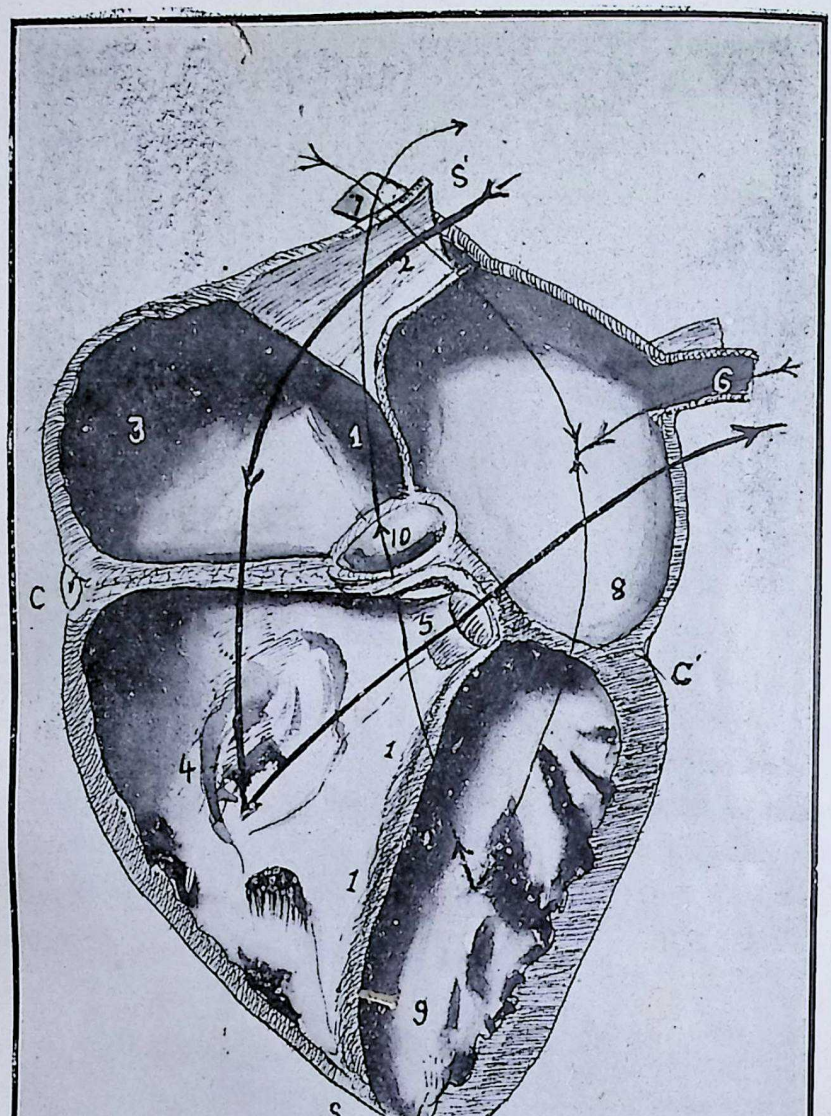
Fig. LXXXVIII



The Heart opened to show its Chambers.

1 The Groove indicating the Septum.
2 The Superior Vena Cava.
3 The Right Auricle.
4 The Right Ventricle.
5 The Pulmonary Artery.
6 The Pulmonary Vein.
7 The Pulmonary Vein.
8 The Left Auricle.
9 The Left Ventricle.
10 The Aorta.

N. B.—In the above chart the course of impure blood is indicated by bold dark lines, whereas that of the pure blood is shown by thin lines.

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The average size of the heart is $4\frac{1}{4}$" long, $3\frac{1}{2}$" broad, and $2\frac{1}{2}$" thick. It is usually smaller in women than in men. It is roughly measured in individuals by the size of the closed fist.

The Chambers of the heart. It has been said that the heart is a hollow organ, but the cavity is not single. A complete muscular partition divides it into two, so that there is a right and a left side, between which there is no direct communication except in the child before birth.

That partition or *septum* is indicated on the outside of the heart by a groove passing from the base to the apex. No. 1 shows this septum in Fig. LXXXVII. This partition as the groove indicates, keeps to the right side of the apex, No. 10, so that the whole of the apex is, by this division, on the left side. The two cavities thus formed are each divided by a partition into an upper and a lower chamber. (Vide Fig. LXXXVIII). The partitions are not permanent, however, for they consist of flap valves, which, when closed, completely separate the upper and lower chambers, but which are capable of opening so that the chambers become continuous, just as folding doors between two rooms, if closed, make them two separate rooms, but if open, make them practically one room. The heart has thus four chambers, two on each side. Fig. LXXXVIII shows them very well. It represents a heart cut open lengthwise. From *s* the upright partition is seen, passing in a slightly irregular course, to *s*, and it is plainly shown how the apex is kept to the left. The cross partition is in the direction of *c* to *c'* and the four chambers are marked 3, 4, 8 and 9. Now the two upper chambers are called *auricles*, the right and the left. The lower chambers are called *ventricles*, again the right and the left.

Numerous blood-vessels are connected with the heart for carrying blood to it and away from it. A short notice of these is taken in what follows. Two large veins open into the right auricle, one at the upper part—the *superior vena cava* and the other at the lower part—the *inferior vena cava*. The superior cava brings

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blood from the head, neck, upper limbs, and chest, being formed by the union of two venous trunks, one from the right side of the body and the other from the left. In Fig. LXXXVIII, it is represented by No. 2. The inferior cava is not to be seen in Fig. LXXXVIII, being behind the parts shown there. It comes from below, and brings the blood from the lower part of the body. Thus these two large veins bring the blood from all parts of the body and pour it into the right auricle; and as we have seen, this blood all passes down into the ventricle. From the right ventricle one large vessel arises—the *pulmonary artery* (the lung artery), which, at a distance of not more than two inches from the heart, divides into two branches of nearly equal size, one for the right lung and another for the left. (Vide Fig. LXXXVII). Each branch, having reached the lung for which it is destined, gives off branches, and these branches again give off others, and so the branching goes on till it ends in fine delicate vessels, capillaries, forming a rich net-work in every part of the lung. Thus the blood, driven out of the right ventricle into the pulmonary artery, is by the artery distributed in fine streams throughout the two lungs. Turn now to the left auricle. Four veins open into it, two coming from each lung—*pulmonary veins*, therefore, (Vide Figs. LXXXVII–LXXXVIII). These veins arise in the lungs from the extremely fine vessels, which are the continuations of the capillaries of the pulmonary artery. The fine vessels unite to form larger vessels and so on the process goes till two large veins are formed from each lung, which pass to the left auricle. The pulmonary veins, therefore, carry from the lungs to the left auricle the blood brought to the lungs from the right ventricle by the pulmonary artery, the same blood that previously entered the right auricle from the superior and inferior venæ cavæ. From the left ventricle one large arterial trunk arises—the *aorta*, the largest arterial trunk in the body. (Fig. LXXXVII). It passes upwards in the chest for a short distance towards the root of the neck, where it gives off branches for both right and left arms, and right and left sides of the head. It then turns backwards and downwards and passes down along the backbone, giving off branches

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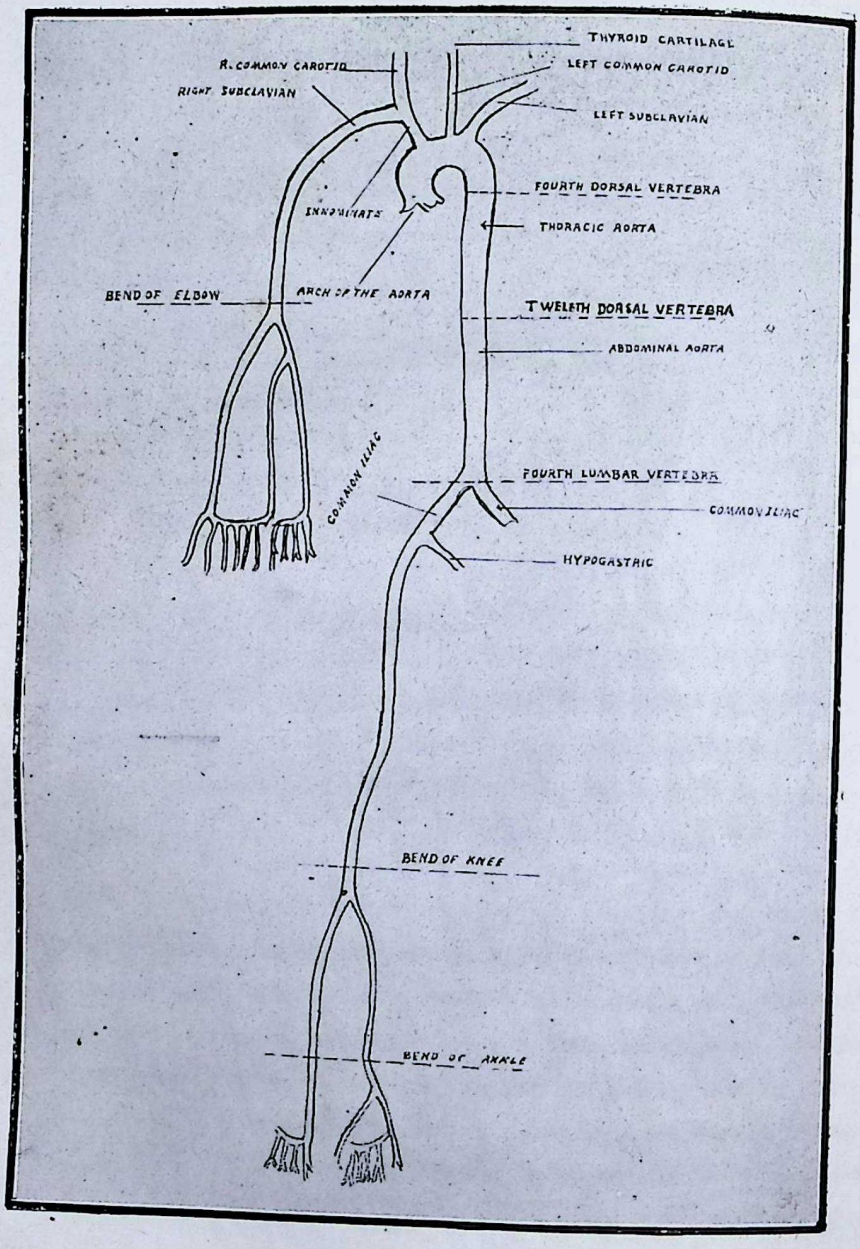
Fig. LXXXIX



Distribution of Arteries.

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on its way, and ending by dividing into branches for the lower limbs. It is the vessel from which branches arise which convey the blood to all parts of the body. (Vide Fig. LXXXIX).

Thus we see that the blood, collected from all parts of the body, enters the right side of the heart by the right auricle and is poured down into the right ventricle, from which it is forced along the pulmonary artery through the lungs. It is there collected by the pulmonary veins and carried to the left auricle to be poured into the left ventricle, and from it forced into the aorta, by the branches of which it is conveyed to every part of the body, only to be again brought back to the right side of the heart. A chief object of distributing the blood through the lungs is to have it purified from certain waste substances which it has received in its course through the body, before it is again sent on its journey from the left ventricle.

The action of the heart. The heart being the chief instrument in maintaining a steady flow of blood through the body, its action must be methodical and regular. It does not contract as a whole. The two auricles contract at the same instant, and the contraction of the two ventricles immediately follows. While the ventricles are contracting the auricles begin to relax, and after the ventricles have contracted, they also relax. There is a period, following the ventricular contraction when the whole heart is at rest, till the auricles again contract. The order of events is thus: contraction of auricles, contraction of ventricles, pause; contraction of auricles, contraction of ventricles, pause, and so on. The contraction is called *systole*, and the relaxation *diastole*, so that the order of events might be stated as systole of the auricles, immediately followed by systole of the ventricles, and thereafter a period during which the whole heart is in diastole. The occurrences follow one another so regularly as to be called *rhythmic*, and, on that account, *the hythm of the heart's action* is spoken of. On an average the heart beats 65 to 75 times a minute. It may be noted here that the beat is due to the sudden and vigorous contraction of the left ventricle which dashes the apex against

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the chest-wall. The heart's action is also accompanied by sounds. If the ear be applied over the heart, two sounds will be heard following one another with perfect regularity. They have been imitated by uttering the syllables *lupp–dupp*. One is heard immediately after the other, then there is a pause, and then the two sounds again; and so on. They are distinguished by being called the *first sound* and the *second sound*. The second sound is short and sharp as compared with the first.

The action of the heart is controlled by two nervous influences, one internal and the other external. It has already been stated that the heart is a muscle. Within this muscular substance masses of nervous matter exist and let off energy which regulates the movements of the heart. This is one influence. The other comes from without. The vagus (vide pp. 197–198 of the current volume) serves as an inhibitory, whereas the sympathetic as an acceleratory nerve. The first checks the activity of the heart and the second promotes it.

THE BLOOD-VESSELS—There are three kinds of blood-vessels: capillaries, arteries and veins. The capillaries are very fine tubes giving off finer branches not greater than the $\frac{1}{2000}$ to the $\frac{1}{3000}$ of an inch in diameter. They are formed by long flattened cells united edge to edge. The arteries are also tubes, but they are surrounded by various coats. They are not all of the same size. Some of them are larger whereas others are smaller. In the large arteries the elastic tissue predominates, while in the small arteries the muscular coat is more abundant. Thus the feature of the large arteries is their elasticity, while that of the small is their contractility. The structure of the veins is practically the same as that of the arteries. They have the same coats, but they are much thinner and more soft. There is also this other difference, that the veins with some exceptions, have valves, which are directed towards the heart and permit the blood to flow in that direction, while preventing its flow in the opposite direction.

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CIRCULATION PROPER

The circulation of the blood throughout the whole body is similar to the circulation through the lungs already described. The former is called the *systemic* or *greater circulation* the latter the *pulmonary* or *lesser circulation.*

The blood which fills the left ventricle is, by contraction, forced into the aorta, which is already filled with blood, so that to make room for the extra quantity the vessel must distend, and the blood already in it must be forced onwards. As this is happening many times in a minute the blood in the aorta is continually being forced into its branches. Now, it gives off branches to every part of the body, to head and neck, to the upper limbs, to the chest and the organs in it, to the organs contained within the belly, and to the lower limbs. So that, to every region of the body, from the crown of the head to the sole of the foot, blood is being carried by arteries. [Fig. LXXXIX]. As these arteries penetrate into the various regions and organs of the body they give off branches, which are continually becoming smaller, till they become microscopic in size and are found penetrating every part. The smallest arteries end in thin-walled capillaries, which from such a close net-work that a pin cannot be passed into a tissue without opening into some of them. The arteries, even the smallest of them, are simply tubes for conducting the blood to its destination; but the capillaries are something more, for their walls are so thin that, though continuous they permit fluid portions of the blood to ooze through to bathe the tissues that surround them. The blood in the capillaries is, therefore, in communication with the tissues surrounding them, and exchanges material with them even as it flows through them. At length the capillaries begin to join together to form larger and larger vessels and so gradually veins are formed, at first microscopic in size, but gradually the blood passes into larger veins formed by the junction of smaller ones and by the addition of other coats till the large veins of the particular limb or organ are reached.

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These join the veins coming from other limbs and organs, until the two large venous trunks are formed, the superior and inferior venæ cavæ, the one coming from the upper and the other from the lower parts of the body, which carry the blood to the right auricle. [Fig. XC]. From the right auricle it passes to the the right ventricle then through the lungs by the pulmonary artery and its branches; and back to the heart, but to the left side, by the pulmonary veins, as already described. By passing into the left ventricle the blood has completed its circuit of the body and lungs.

The circulation in the arteries. It has been pointed out that the large arteries are specially elastic. The effect of this is not difficult to understand. Take the aorta as an example. It is filled with blood, but by the contraction of the ventricle an additional quantity is thrown into it. Sufficient room cannot at once be made by the onward flow of that which already occupies the vessel and so part of the vessel distends sufficiently to accommodate it. As soon as the contraction of the ventricle is over, the force distending the artery is diminished and, by their own elasticity, the walls of the vessel recoil, that is, they return to their natural degree of distension. In doing this the walls press on the blood contained by them, and tend to drive the blood both backwards and forwards. The blood is prevented passing backwards by the closure of the aortic valve, and it must all pass on into the next part of the artery, which in turn distends being already full, to receive it. The same process is here repeated; the distended wall speedily recoils and passes the blood on to a succeeding part, which, also, first dilates and then recoils on the blood within it. Thus the contraction of the heart is not the only force in driving on the blood. It is aided by the elastic recoil of the arterial walls succeeding it, and the blood is forced onwards in waves.

This jerky movement of the blood can be felt in the arteries where they approach the surface of the body. The usual place

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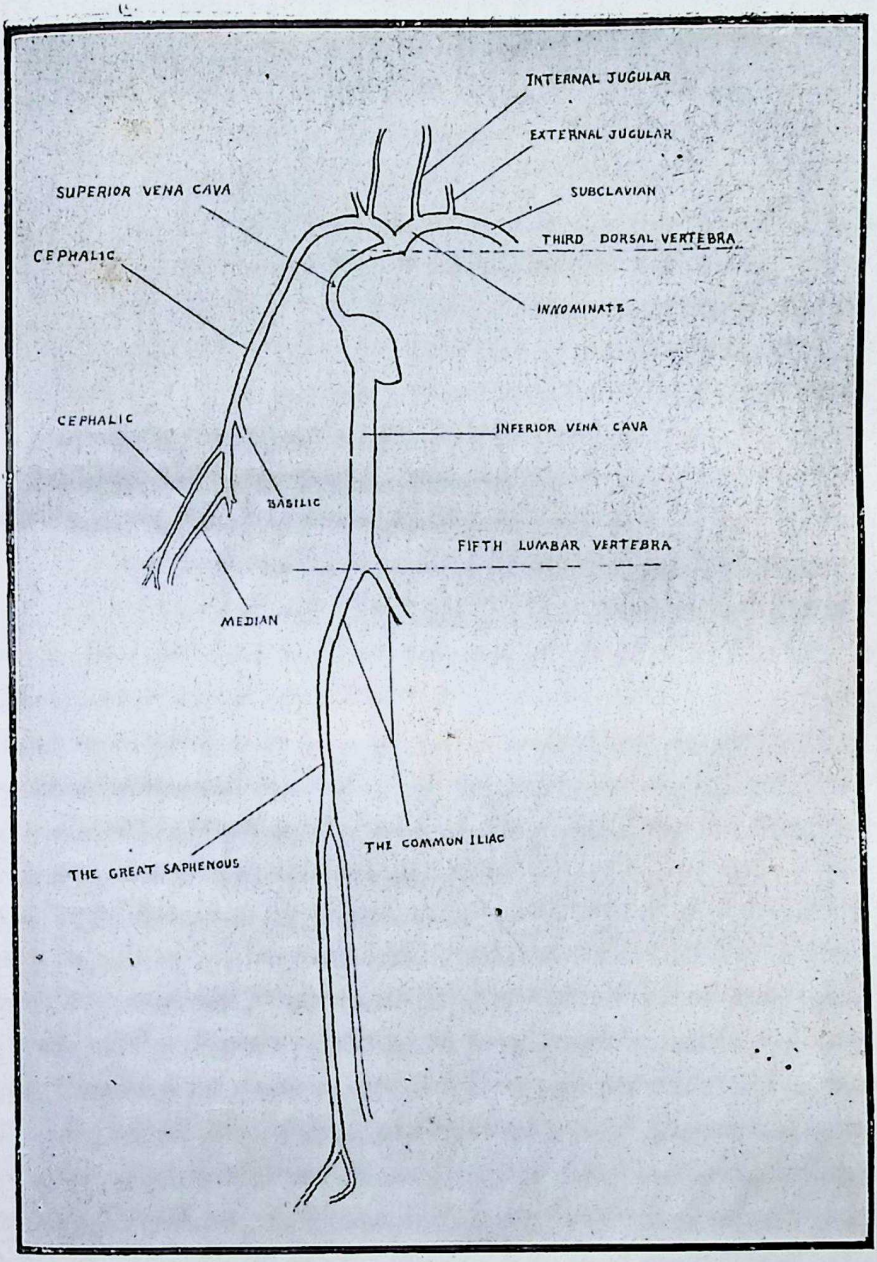
Fig. XC



Distribution of Veins.

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it is felt is in the wrist, the throbbing movement there being called the *pulse*.

While elasticity is the feature of the large arteries, the *contractility of small arteries* is their characteristic. If the muscular fibres which surround the vessel contract, the channel will be narrowed and less blood will be permitted to flow through it. If the muscular fibres relax, the force of the blood within the vessel—*the blood pressure*—will cause the channel to enlarge by dilating the tube, and more blood will be permitted to flow along. Thus the diameter of the vessel may be regulated by the muscular contraction, and the quantity of blood proceeding to a tissue or organ will be thereby affected.

The circulation in the capillaries is to be considered next. From the arteries the blood flows to the capillaries. One of the important aspects of this circulation is the continuous and smooth flow of blood, the arterial jerks being lost here. The next thing noticeable, connected with the capillaries, is the thin walls of the vessels, so that the oozing of fluid, already referred to, for purposes of nourishing the tissues, is easily understood. Another feature is that every minute part of tissue is so surrounded with capillaries that it cannot fail to receive nourishment from all sides.

Generally speaking, every organ and tissue of the body abounds in capillary blood-vessels, even bone being interpenetrated by them. Tissues so traversed by vessels are said to be *vascular*. There are, however, a few tissues which are *non-vascular*, that is, they have no such system of vessels within them. These are *epidermis* and *epithelium*, in other words the surface layer of the skin and mucous membrane, and nail, hair, the substance of the teeth and cartilage or gristle. Such tissues, however, are closely connected with moist vascular tissues, from which they are able to suck up nourishment.

The circulation in the veins is characterized by a continuous flow, the wavelike movement having been completely lost in the capillaries. Besides the force from behind—the force that is

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transmitted through the capillaries from the arteries—other agents enter to impel the blood in its progress through veins. Chief of these are the valves which are present, with exceptions, in veins, and permit the flow of blood towards the heart, but close if there is any attempt at a backward flow. Contracting muscles, by pressing on veins, and, consequently, on the blood they contain, aid in the venous part of the circulation.

Nervous control of the circulation. The walls of the blood-vessels are largely muscular. These muscular fibres are beyond the control of the will. Nevertheless they are controlled by the nervous system, by the agency of nerves distributed among the muscular fibres. The nerves are called *vasomotor* and they are governed from a centre—*the vasomotor centre*—situated in the hindmost part of the brain. The influence on the vessel may be briefly stated thus:—By the nervous energy continually reaching the muscular walls they are kept in a moderate state of contraction or tone so that the channels are maintained at an average size. If the vasomotor nerves are stimulated more than usual, the muscular walls contract more, the size of the channel is diminished, the quantity of blood flowing through it is correspondingly diminished, and the supply to the part lessened. If the stimulus is less than usual, the amount of contraction is lessened, the vessels dilate by the force of blood within them, the channel becomes widened, and the supply to the part is increased. Now various influences from various parts of the body, or from the brain itself, may reach the vasomotor centre and excite it to increased activity; the nerves are thereby stimulated and the vessels contract. But there is another curious effect that may be produced on the centre, what is called an *inhibitory* or restraining effect, whereby the ordinary influence of the centre is, for a time, suspended, the tone of the vessels becomes diminished, and their channels immediately widened. The production of blushing and pallor is thereby explained.

Blushing is caused by some emotion which acts on the vasomotor centre and diminishes its activity. The tone of the vessels

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being lessened they dilate, more blood rushes along their channels, and the skin becomes redder and hotter by the increased quantity of blood. It is usually in the face that this is manifested.

Pallor is just the reverse condition. Some emotion so acts on the vasomotor centre as to increase its activity. The blood-vessels contract, less blood flows through them, and the part becomes pale. Thus the same emotion that causes redness of one person's face may produce paleness of another's.

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A NOTE ON THE REPRODUCTIVE ORGANS OF MAN[1]

THE male reproductive organs include the *testis*, the *epididymis*, the *ductus deferens*, the *vesicula seminalis*, the *ejaculatory duct* and the *penis* together with the *prostate gland*.

THE TESTES—These are the two reproductive glands of the male. They are held by the spermatic cords, in a sack called the *scrotum* which hangs on the outside of the body, between the thighs and underneath the penis. The left testis hangs somewhat lower than its fellow because the left spermatic cord is longer than the right. The weight of each testis varies from 10.5 gms. to 14 gms. The structure of the testes consists of lobules containing very small tubes which afterwards join together and form a larger tube called the *epididymis*. Fig XCI illustrates the right half of the testis, epididymis and spermatic cord. In this picture the testis has been exposed by removing one of its outer coats and the right half of this has been represented in a verticle section so as to show the lobules. It is in the small tubes contained in these lobules that the semen is produced. It consists of a fluid portion, solid particles called seminal granules and spermatozoa; the last being the essential agents of impregnation.[2]

THE SCROTUM—This is a cutaneous pouch containing the testes and the lower parts of the spermatic cord. The external appearance varies under different circumstances. Thus under the influence of warmth, and in old and weak persons, the scrotum is elongted and flaccid; but under the influence of cold, and in the young and robust, it is short, is covered with folds and sits tight on

1 In what follows we have given no figures to illustrate the external appearance of these organs as it is so familiar to every one of us.

2 The spermotozoa are minute elongated particles with an oval extremity or body, and a long slender filament. They are only about $\frac{1}{450}$ of an inch in diameter; and 226,267,600 are produced in both testes per week. It is believed that quite a large number of these are discharged at one coitus.

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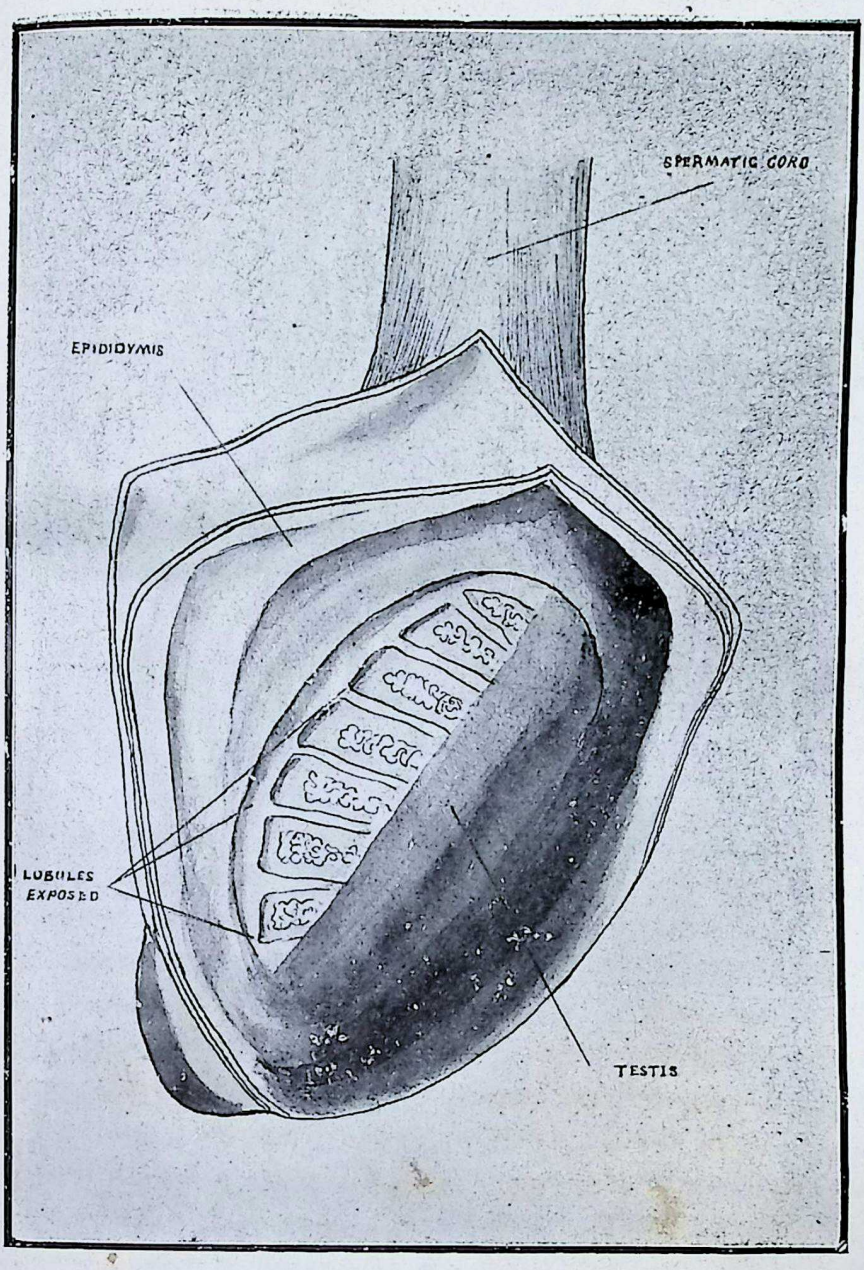
Fig. XCI



The Testis, Epididymis & Spermatic Cord.

(The right half of the testis, is given in a vertical section to show the arrangement of lobules, containing small tubes.)

पुस्तकालय
गुरुकुल कांगड़ी

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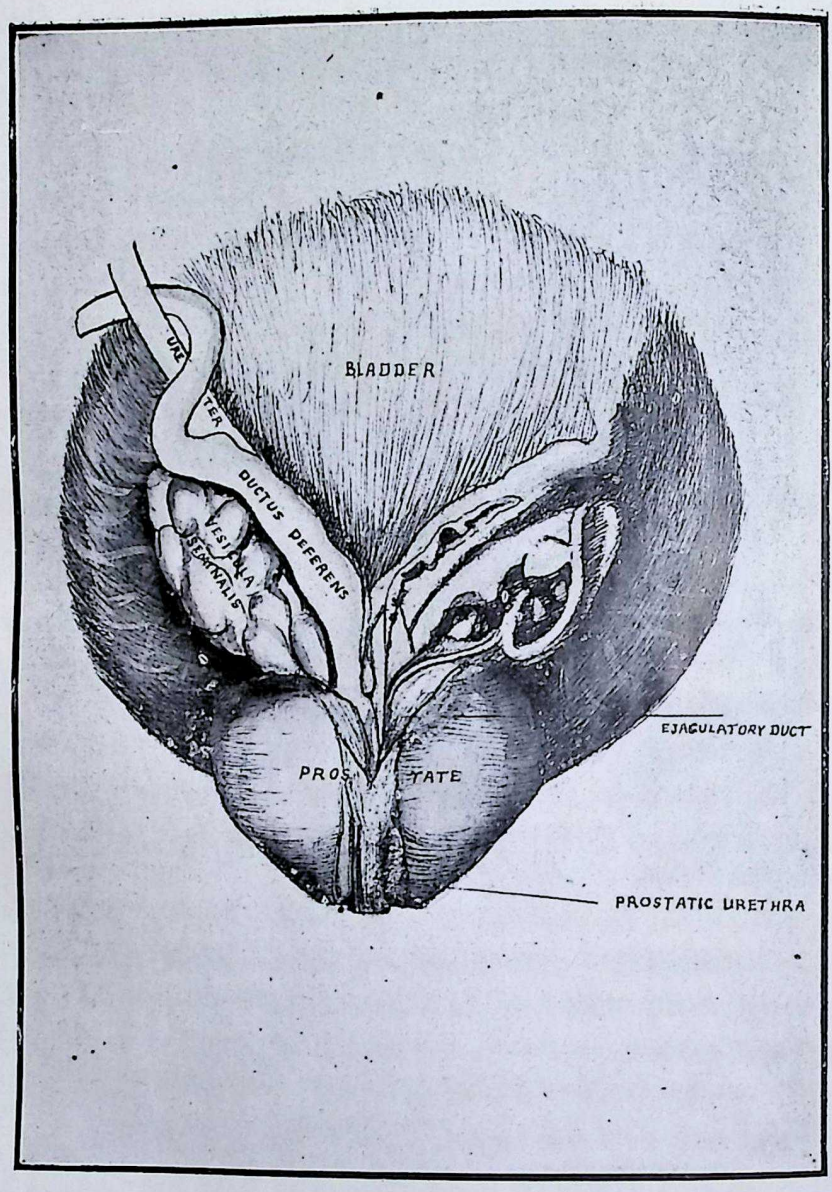
Fig. XCII



The Ductus Deferens, Vesicula Seminalis & Prostate.

(The front walls of the left part have been removed.)

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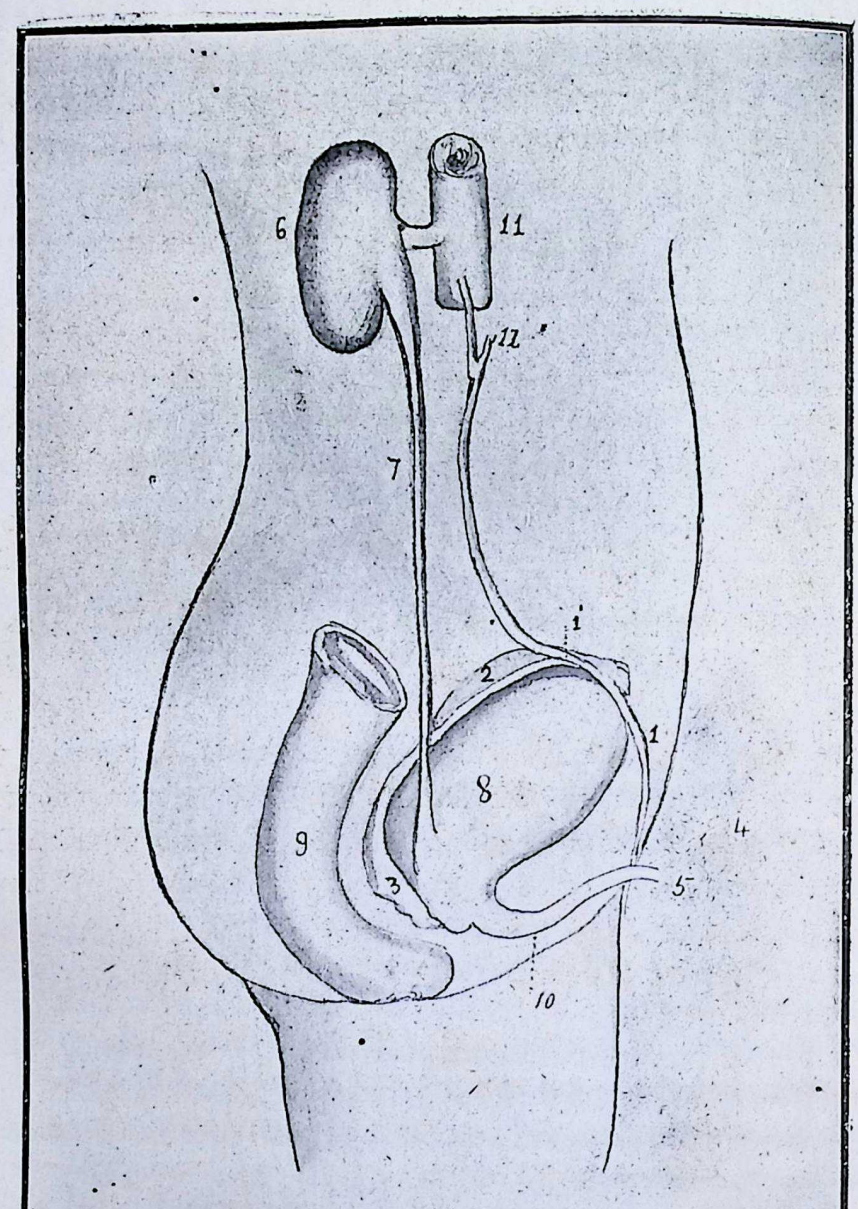
Fig. XCIII



The Urinary & Reproductive Systems of Man.

1 The Spermatic Cord.
1′ The point where the Vas Deferens separates from the Cord.
2 The Vas Deferens.
3 The Vesicula Seminalis.
4 The Urethra.
5 The Penis.
6 The Kidney.
7 The Ureter.
8 The Bladder.
9 The Rectum.
10 The point where the Ejaculatory Duct joins the Urethra.
11 The Abdominal Aorta.
12 The Permatic Vein.

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the testes. The scrotum is a wonderful covering for the protection of the testes. These glands lie loosely suspended in its cavity. There they are surrounded by a slippery membrane and therefore can move about very freely within their sack, thus avoiding injuries from blows and squeezes. The skin of the scrotum is very elastic and capable of great distention. The spermatic cords are mainly composed of arteries, veins and nerves connected with testes, and the ductus deferens. They have their origin in the abdomen and are attached to the testes in the scrotum. In Fig. XCIII, No. 1 indicates the spermatic cord.

THE DUCTUS DEFERENS—This is a continuation of the epididymis. At some distance from its origin, it separates itself from the rest of its cord at a point indicated by No. 1 in Fig. XCIII, and passing backward and downward, in contact with the bladder, pours the semen it conveys into the vesicula seminalis. No. 2 in Fig. XCIII shows this duct, the last part of which is illustrated in Fig. XCII.

The VESICULA SEMINALIS—This is a sack situated between the bladder and the rectum. (Fig. XCIII, No. 3). As illustrated in Fig. XCII there are two sacks one on each side, serving as reservoirs for the semen, till it is discharged. It is not, however, that the semen flowing into these sacks should necessarily be discharged. There is another way of disposing of the fluid and this is by absorbing it again into the system.

THE EJACULATORY DUCT—As represented in Fig. XCII there are two ducts, the right and the left. Each is formed by the union of the duct of the vesicula seminalis with the terminal part of the ductus deferens and is nearly 2 cm. long. The ducts diminish in size and also converge towards their terminations. They open into that part of the urethra that crosses the prostate gland, by means of slit-like orifices which are ordinarily closed, but open at the time of a seminal discharge.

THE PENIS—The only thing to be noted in regard to the penis is the passage that crosses it. It is called *urethra* and is used for the discharge both of urine and semen alike. Nos. 4

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and 5 in Fig. XCIII indicate the urethra and the position of the penis respectively.

THE PROSTATE—This is a small glandular body surrounding the neck of the bladder and commencement of the urethra. (Fig. XCII). Its secretion is a milky fluid and is poured into the urethra at the time of the seminal discharge.

To sum up we find that the semen is manufactured in the testes. From there it is conducted first through the epididymis and then through ductus deferens to the vesicula seminalis. Here the fluid is deposited till it is either discharged through the ejaculatory duct and urethra, or absorbed again into the system.

NOTE—Very often the reproductive system is confounded with the urinary system. But the two are quite distinct. (Vide Figs. XL, XLI, XLII and Fig. XCIII of this volume). Urine is first manufactured in the kidneys whence it drops through the ureters into the bladder. Here it is accumulated till it is discharged through the urethra. So we find that the only piece of apparatus common to both the systems is that part of the urethra which lies between the orifices of the ejaculatory ducts and its external opening.

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TWO MORE LIMITATIONS TO S'ĪRSHĀSANA[1]

In the third number of this volume we have already sounded a note of warning against the practice, combining S'īrshāsana with violent exercises such as wrestling or running. We had stated our reason in the following words :—

"The exercise of wrestling is so thorough and so violent that the whole muscular system is worked up. The waste products resulting from this work accumulate in the muscle tissue; and the rapid blood circulation is busily engaged in removing these waste products as well as in repairing the damages. If at this juncture the wrestler stands on the head, he diverts the whole blood stream to his brain and starves the other parts of his body. Nor is this sudden rush of blood to the brain calculated to do any good to it. Nay it is positively harmful."

After a very careful study of the different systems of physical culture, we have come to the conclusion that the practice of Yogic poses can never be combined with exercises based on muscle contraction, whether Indian or foreign. This is because Yogic physical culture differs fundamentally from other systems. Although we cannot treat this subject at any length in these casual notes, a very brief[2] statement of the principles underlying the Yogic and other systems, seems to be opportune at this stage of our study.

Almost all the systems of physical culture obtaining either in India or abroad, principally look to muscle culture and through it to the culture, of nerves, ductless glands, etc. Yogic physical culture, however, looks to the muscle incidentally and principally concerns itself with nerves and ductless glands. Again the means

1 Information on this point has appeared on pp. 129–138 and 222–224 of the current volume.

2 The following statement is not only brief, but it is incomplete; because it takes into account only those points of difference that are useful in understanding the difficulty of combining S'īrshāsana with muscular exercises.

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of inducing richer and fresh blood supply to the organ concerned, are essentially different in these cultures. Non-Yogic cultures depend upon the contraction and relaxation of the muscular tissue to draw a liberal blood supply, whereas the Yogic culture gets the arterial mechanism arranged in such a way that gravitation attracts the larger supply of blood.

We shall take an illustration from the portion of the Yogic practices that we have already studied. To build a healthy thyroid, non-Yogic systems would prescribe muscular exercises for the neck, involving repeated contractions and relaxations and also a massage of the cervical region. Yogic system, however, would concern itself with the muscles of the neck only incidentally, No repeated contractions and relaxations would be advised. Sarvāṅgāsana would be the means to this end. Again the richer blood supply brought to the thyroid in other systems of physical culture, is the result of the activity of the muscles of the neck; whereas in Yoga the blood supply is induced by the force of gravity, the arota and other arteries being, so to say, upturned.

This difference in method leads to wider difference in the physiological effects of the two sets of exercises, the Yogic and non-Yogic. During and after the non-Yogic exercises, blood is busy in repairing and invigorating the muscular tissue *primarily* and the nerve or gland tissue *secondarily;* but in and after the Yogic exercises, blood is engaged in repairing and invigorating the nerve and gland tissue *primarily* and the muscular tissue *secondarily*. Now if the Yogic practices are started *immediately after* the non-Yogic muscular exercises, the muscle tissue would not get the intended blood supply; whereas if the non-Yogic exercises were undertaken *immediately after* the Yogic practices, the nerve and gland tissue would suffer.

Hence it is desirable that not only wrestling and running, but all non-Yogic exercises and the Yogic practices should be done separately. An interval of at least 20 minutes should be allowed to pass between the two sets of exercises. Without

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giving reasons which would entail much physiological and psychological discussion, we may advise our readers to take muscular exercises first and the Yogic exercises afterwards, if they want to combine the two, of course, allowing the necessary intermediate rest.

Though the above discussion refers to the Yogic poses in general, it particularly holds good in the case of S'īrshāsana. In this practice the whole blood stream has a tendency to run to the brain; and the muscular tissue is very likely to be starved, if the Āsana is done immediately after active muscular work.

Some people look to be labouring under the impression that one and the same man cannot practise both muscular and the Yogic exercises with advantage. To our mind this impression looks to be wrong, at least so far as physical culture is concerned. On the contrary we hold that the two systems may be made to yield beautiful results, provided they are combined in due proportion and the physiological needs of each are carefully looked to.

Having discussed the limitations arising from the rest required before or after muscular exercises in undertaking S'īrshāsana, we now proceed to state another limitation to the practice of this pose.

Some persons suffer from excessive dryness of fæces. This leads to constipation and is generally due to abnormal quantities of water being eliminated from the system and to a comparatively smaller intake of water to compensate for the heavy loss. The popular mind believes that S'īrshāsana is capable of curing any and every sort of constipation, and would zealously advocate its practice even in cases of unusually hard stools. The result is aggravated constipation if no measures are adopted to make up the abnormal loss of water from the body.

There are various causes leading to an abnormal elimination of water. Some persons perspire profusely. Generally people that have accumulated excessive quantities of fat have such a

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tendency. The skin is busy sending out water especially in hot weather.

There are others who suffer from the over activity of the kidneys. The kidneys are glandular organs. They are two in number and are situated in the cavity of the abdomen in the lumbar region, one on each side of the vertebral column. A reference to Figs. XL–XLII of the current volume will show clearly the exact position of these bodies. No. 13 indicates them. It will be seen that the right kidney is situated below the liver, while the left is situated below the spleen. Both the organs lie close against the back wall of the abdomen, having the coils of the intestines arranged in front of them. In man each kidnay is about 4" long, 2" broad, 1" thick and weighs about 4½ oz.

The function of the kidneys is to separate the constituents of urine from the blood. These constituents consist mainly of water and some solids held in solution therein. In a hundred parts of urine, 95 parts are approximately made of water and 5 only of solids, namely, urea, uric acid, etc. This separated liquid moves down the ureters, drop by drop, and is accumulated ultimately in the bladder to be discharged when a sufficiently large quantity is stored up. (Vide Figs. XL–XLII of the current volume).

Now under normal circumstances only as much of water is eliminated as the system can spare; but under abnormal conditions the kidneys excrete water in a quantity too large to be spared, and this increases the thirst of the tissues. The disease, *diabetes* is wellknown. There are two varieties of it: *diabetes insipidus* and *diabetes mellitus*. The latter is distinguished from the former by the presence of sugar in the urine. Both the types are characterized by the passage of large quantities of urine. This heavy loss of water due to abnormal formation and discharge of urine, makes the whole system dry. We can find evidence of this fact in the excessive thirst that torments the people suffering from this disorder. Under such circumstances, if the thirsty tissues of the body are not supplied with water by repeatedly

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taking large draughts of it, they absorb whatever moisture is available in the colon contents, with the result that the fæces get terribly dry and the bowels become seriously constipated.

The right remedy for such a constipation is to allow the patient as much quantity of water as is necessary for making up the loss of moisture due to the hyperactivity of the kidney. But as stated above the popular mind holds that such cases could be cured by S'īrshāsana and vehemently advocates its use only to be awfully disappointed. Students of Yogic therapeutics will do well, therefore, to recognize this limitation, and would not prescribe S'īrshāsana to diabetic persons, without previously making arrangements for satisfying the thirst of the tissues.

What has been stated here of S'īrshāsana, holds good of other exercises, Yogic or non-Yogic. Various people undergo very vigorous exercise and consequently perspire freely. Very large quantities of water are lost through this perspiration. If the intake of water is not proportionately increased, such people suffer from excessive dryness of fæces and consequent constipation. Ignorance of physiological laws leads them to believe that their exercise is not vigorous enough to secure a satisfactory evacuation. Hence they indulge in more active exercises which only result in more serious intestinal stasis. We have ourselves seen many cases of this type. They could be given much relief simply by reducing the amount of their exercise and by administering a large proportion of water. Persons that had ceased to put on weight, in spite of their active exercises and rich diet, began to increase in bulk even in a month after this change. It does not require a medical expert to know whether one is over exercising oneself. Scanty and high coloured urine is a fair indication of the condition, and should warn a person sgainst either overworking himself or taking an insufficient quantity of water.

The best plan for persons suffering from serious dryness of fæces is to make, what in India is known as *Ushahpāna,* which

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means *drinking water at dawn.* Āyurveda which prescribes this practice claims wonderful results for it. Even though we are not inclined, for various reasons, to interpret the original text literally, we must admit that the practice is immensely helpful in relieving constipated persons suffering from the dryness of stools. A bumperful of cold water not only removes the dryness of the fecal matter, but it directly induces peristalsis, moving the bowels to activity. So people who start practising S'īrshāsana to get rid of constipation of the type discussed above, should first begin Ushahpāna and they will, in all probability, get the necessary relief.

Real Ushahpāna is done through the nose when one breaks his slumber. But for our purpose we can drink through the month, as usual. At dawn, a large cup of cold water is to be taken, of course, after properly rinsing one's month. The water should be of body temperature. This is secured by keeping a jug of water in the sleeping room over night and using it in the morning. The quantity of water to be used may be increased from 8 to 25 oz. Some people seem to think that a morning nap is essential after Ushahpāna. But there is no necessity of it, so far as we know, according to either the ancient text or modern science.

A similar bumper at bedtime will be found to have beneficial effects.

We beg to repeat here what we said in the last two numbers. S'īrshāsana is a fine exercise for constipation, provided it is wisely used having regard to the various limitations laid down here and heretofore.

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Fig. XCIV

Preparation for Ardha-Matsyendrāsana.

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ARDHA-MATSYENDRĀSANA

or

THE HALF MATSYENDRA POSE

THE NAME :—

The pose is called the Half Matsyendra Pose because it requires only half the technique of the full Matsyendra Pose. The full posture was invented by Bhagavāna Matsyendra, one of the pioneers of Yogic culture. Although of high spiritual value the original pose is somewhat difficult to practise; and we have not mentioned it here because at present we are discussing Yogic process from the therapeutical point of view and not from the spiritual. The Half Matsyendra Pose combines both therapeutical advantages and ease.

THE TECHNIQUE :—

To start with the student sits on his seat with his legs fully stretched out and placed close to each other. (Fig. XCIV). He then bends in the knee one of his legs, say the right, and folding it double upon the thigh, sets its heal right, on the perineum which indicates the region between the anus and the scrotum in the male, and between the anus and the vulva in the female. If we feel this part of our body with our fingers, we will find two hard bones on the two sides with a soft part between. It is against this soft part that the heel is to be set. Care must be taken not to allow any portion of the scrotum to slip between the heel and the perineum. This can be done by lifting the whole scrotum with the left hand while the right hand is engaged in arranging the right heel. Sometimes an attempt is made to sit on the heel, but this is wrong and should be studiously avoided. When rightly adjusted the right sole will closely

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touch the left thigh. (Fig. XCV). Then the student withdraws his left leg and bending it in the knee arranges it in such a way that the left foot rests on the right side of the right thigh. (Fig. XCVI).

The main feature of the pose consists in twisting the spinal column. The steps taken upto now are only a preparation for securing this twist with mechanical advantage derived from particular arrangements of the extremities. The erect knee, here the left, is now to be used as a fulcrum upon which the right shoulder-joint is to rest its back. (Fig. XCVIII). This is done by passing the right hand round the left knee and rotating the whole trunk to the left, till the right shoulder and the left knee stand pressing against each other. With a view to obtain a full rotation of the trunk and to prevent the knee slipping off the shoulder, the right hand is fully stretched out and made to grasp the left foot or its toe which is now available on the wrong side. Care should be taken not to unduly stretch out the elbow-joint, as such a strain is likely to result in a fracture. This danger is completely avoided by firmly setting the shoulder against the knee.

In order to obtain additional mechanical advantage for securing the spinal twist, the student now employs the left hand. He swings it back and tries to have a hold upon the right thigh just below the hip-joint. Fig. XCVIII shows the left hand swung back and Fig. XCVII represents the fingers clutching the thigh. Thus there are two forces operating upon the two upper corners of the trunk twisting it to the left, and these two together are competent to effect a fully possible twist. This contrivance, however, does not affect the cervical vertebræ. In order that these might cooperate with the remaining, the head is swung to the extreme left till the chin finds itself almost in a line with the left shoulder. Figs. XCVII-XCVIII represent full Ardha-Matsyendrāsana, the first figure giving the front and the

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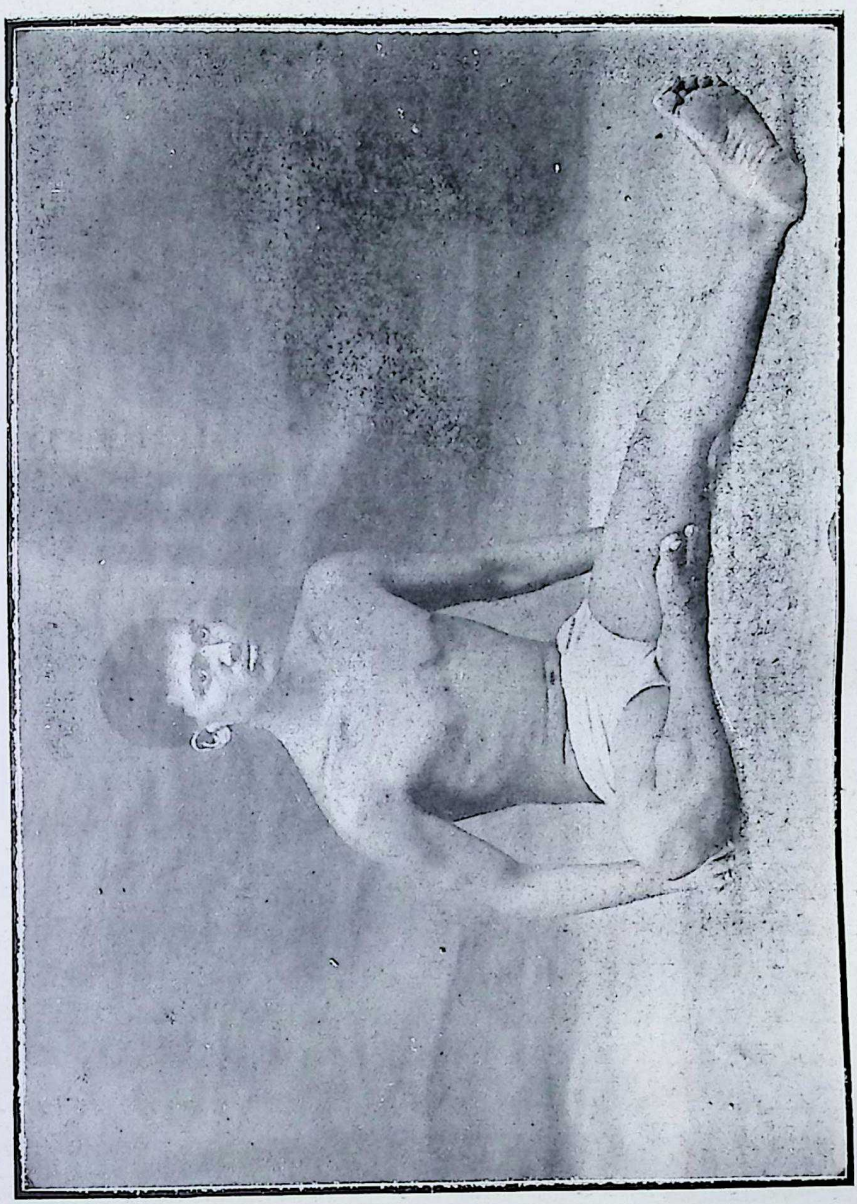
Fig. XCV



Ardha-Matsyendrāsana.
(The start)

पुस्तकालय
गुरुकुल कांगड़ी

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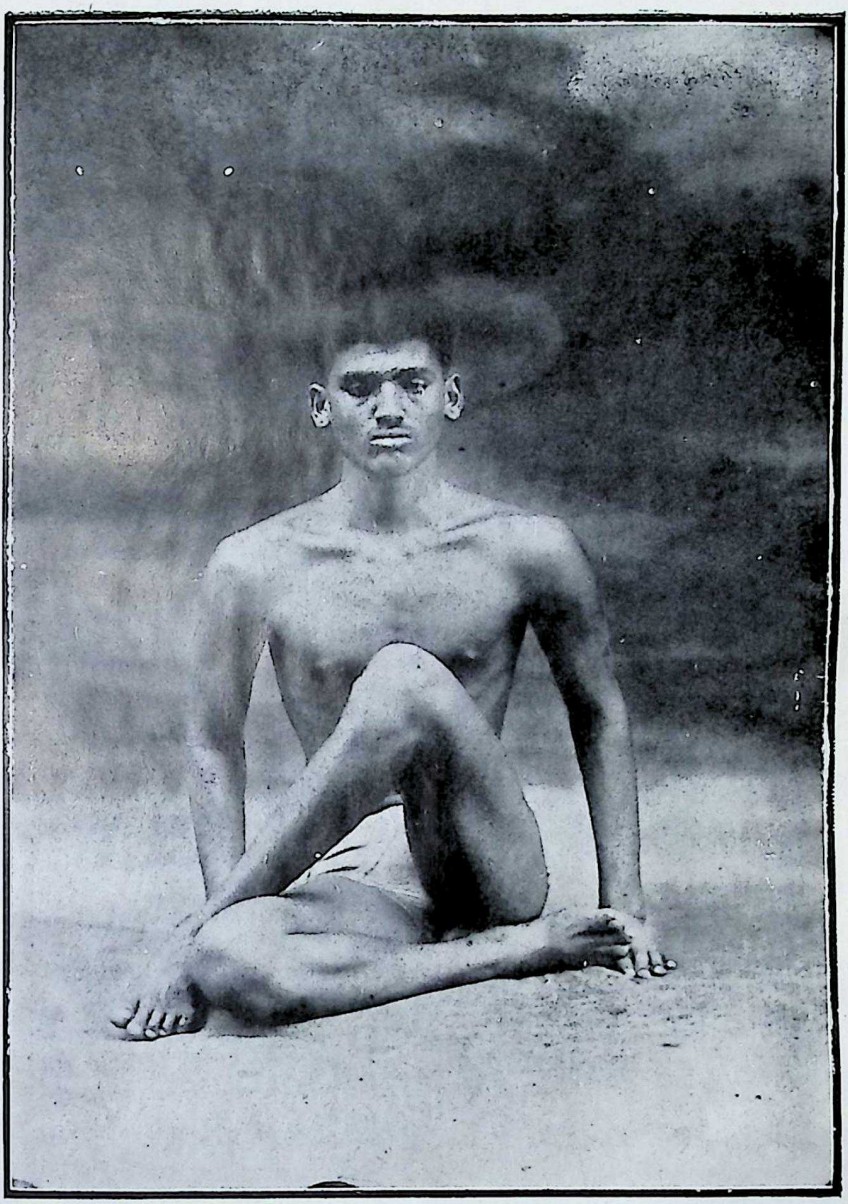
Fig. XCVI



Ardha-Matsyendrāsana.

(The next step)

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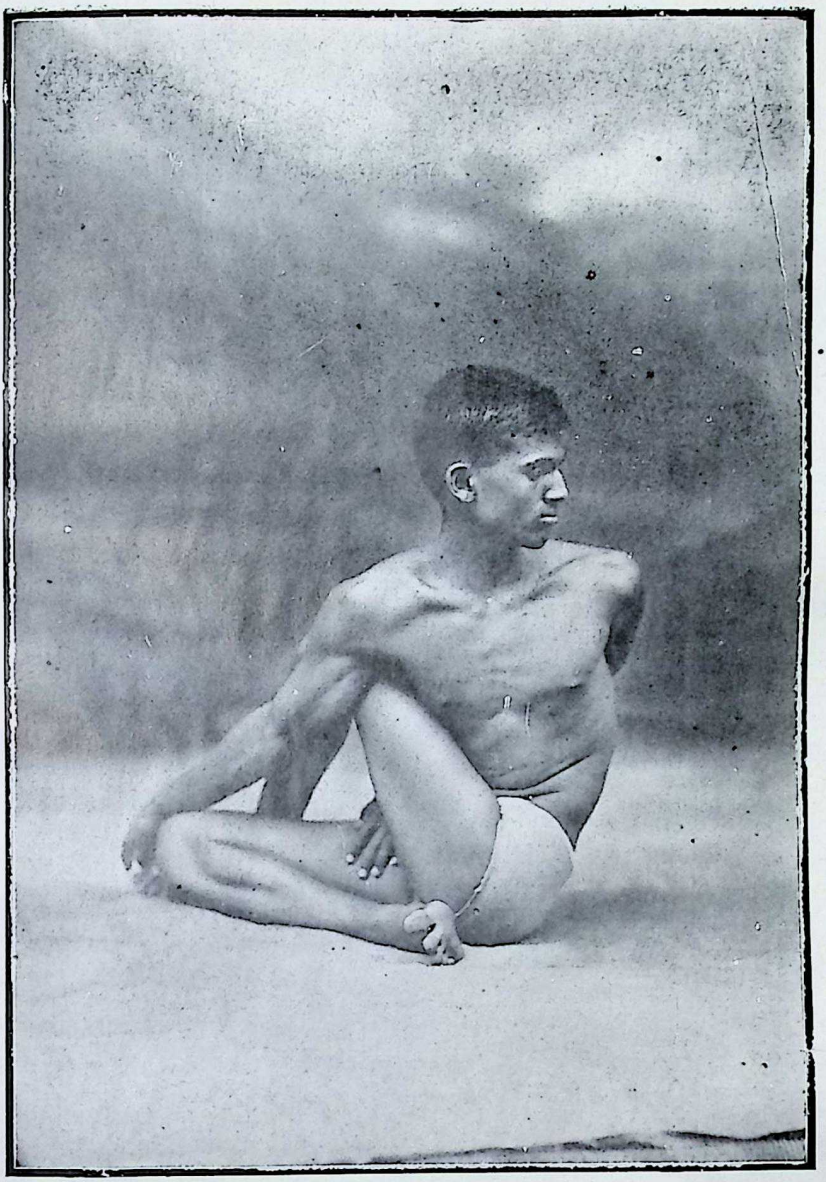
Fig. XCVII



Ardha-Matsyendrâsana.

(Full pose)

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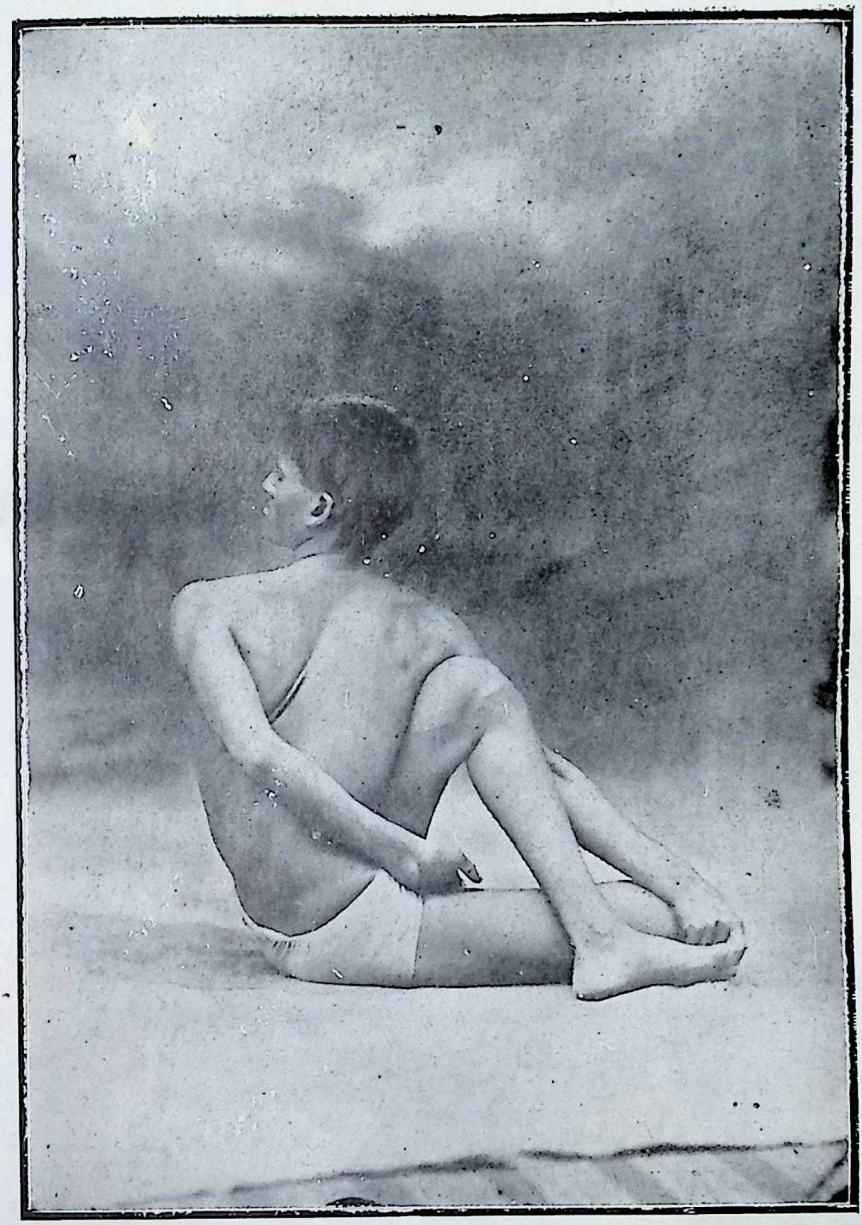
Fig. XCVIII



Ardha-Matsyendrâsana.

(Back view)

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second giving the back view of the same. All the while the student takes care to see that his chest stands erect and does not droop down. The same pose is to be tried using the left extremities instead of the right and vice versa so that the two opposite twists would move between them the different vertebræ through all the rotating space available.

The pose may be practised only for some seconds to start with, the maximum period to be devoted to each side being not more than a minute. For a student of general physical culture one twist each side is sufficient; but for curative purposes twist may be repeated thrice according to individual strength.

POINTS OF STUDY :—

(a) *Muscles :—*

Ardha-Matsyendrāsana brings into play all the muscles of the trunk, if done both ways. The health of the spine very largely depends upon the health of the muscles that hold the different vertebræ together. Hence Ardha-Matsyendrāsana is a fine exercise for the spinal column. The abdominal muscles too play an important role in this pose and the pressure exerted by the opposite twists helps to promote bowel movement.

(b) *Vertebrae :—*

Every vertebra of the spine enjoys full movement through its rotating space during the two twists. The ligaments also share the same fate and are consequently strengthened.

(c) *Nerves :—*

All the 31 pairs of spinal nerves and the sympathetic are toned up, because this pose promotes blood-circulation of the parts where these nerves arise.

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NOTE—

We have seen that Bhujaṅgāsana, S'alabhāsana and Dhanurāsana give a backward bent to the spine; whereas Halāsana gives a forward bent. Now we see that Ardha-Matsyendrāsana gives the right and left twists to the spinal column. It will be readily seen that, if we add exercises that bend the vertebral column sideways, we shall have secured all possible movements to the spine. This we will do in the next volume.

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A COURSE OF YOGIC PHYSICAL CULTURE

for

THE AVERAGE MAN OF HEALTH

Morning

1 Uḍḍiyāna ... 3 to 7 turns, adding one turn per week.
2 Nauli ... Do Do

Evening

1 S'īrshāsana ... $\frac{1}{4}$ min. to 12 mins., adding $\frac{1}{2}$ min. per week.
2 Sarvāṅgāsana ... $\frac{1}{2}$ min. to 6 mins., adding 1 min. per week.
3 Matsyāsana ... $\frac{1}{4}$ min. to 3 mins., adding $\frac{1}{4}$ min. per week.
4 Halāsana ... 1 min. to 4 mins., adding 1 min. per week.
5 Bhujaṅgāsana
6 S'alābhāsana
7 Dhanurāsana
} ... 3 to 7 times each; the pose being maintained for 10 seconds, adding 1 more turn every fortnight to each.
8 Ardha-Matsyendrāsana ... $\frac{1}{4}$ min. to 1 min., adding $\frac{1}{4}$ min. per week.
9 Mayūrāsana ... $\frac{1}{6}$ min. to 2 mins., adding $\frac{1}{4}$ min. per week.
10 Yoga-Mudrā ... 1 min. to 3 mins., adding 1 min. per week.

N. B.—Students of Yogic physical culture will do well to remember the limitations that have been indicated from time to time. The course given here is not complete, but has been arranged with a view to enable the readers to well utilise the material already published in these pages. The sequence and proportion of time is perfectly general and has no reference to individual cases.

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SARVĀṄGASANA

or

THE PAN-PHYSICAL POSE

PART II

(Concluded)

AFTER having discussed the effects of this pose upon the thyroid and parathyroids, we proceed to see how this Āsana influences the venous blood circulation and then to enquire whether it can help to cure seminal weakness.

A careful study of the note on blood circulation which appears on the preceding pages of this section, will make it clear that there are differences of vital importance in the two types of circulation, *arterial* and *venous*. So far as the onward march of of the blood is concerned, the arteries have a great advantage over the veins.

i The propelling force of the heart makes itself fully felt throughout the arteries, but very feebly influences the venous blood, *almost* the whole of it being lost in the capillaries.

ii The arteries are elastic and recoil upon the volume of blood that courses through them. Their firm grip drives the blood onward as it passes through them. There being no elastic tissue in the veins, their walls become distended under high blood-pressure and grow weaker and weaker.

iii The walls of the arteries are so thick that they do not lose their cylindrical form even when they are empty; but the veins collapse when no blood runs through them owing to the thinness of their walls.

iv The arterial blood has to run down from the heart to the foot; but the venous blood has to accomplish an

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uphill task, it has to rise to the heart against the force of gravity. Hence the length of the column of the arterial blood helps its circulation, whereas the length of the column of the venous blood retards its onward movement.

In order to compensate for the disadvantages under which the venous blood circulation labours, Nature has provided the veins with a number of valves. These are more numerous in the extremities than in the trunk, the number of valves in the lower extremities being larger than that of the valves in the upper ones. The nature of valves must have become familiar to our readers by this time. They allow things to escape; but if the same things were to force their way backwards, they close under the very pressure of these things and prevent their reverse passage. We have studied the behaviour of the ileo-cecal valve. (Vide p. 39 of the current volume). When healthy it allows things to pass from the small intestine into the cecum, but prevents the cecal contents from going back into the small bowel. In the same way, the venous valves allow the blood to pass towards the heart, but stop it from running away from it.

This nature of the venous valves can be studied in the following manner even without dissection. "Exercise the arm for a few minutes to increase the circulation in it; the veins on the front of the forearm will then be prominent. The veins, looked at through the skin, appear bluish in colour, but the blood in them is dark reddish-purple. With the finger, stroke one or other of the veins upwards towards the shoulder. You will find that you can press much of the blood out of it. Now stroke the vein downwards towards the hand; you cannot press the blood out of it, and the vein swells up and distends, the swelling being greatest at one or two places along the vein, thus forming 'knots'. These knots mark the position of valves which prevent the return of the blood towards the hand."

These valves divide the veins into different chambers, each valve being required to support only that quantity of blood which

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lies in the upper chamber. If we take *the great saphenous vein* which traverses the whole length of the leg (Fig. XCIX), we find that it has 10 to 20 valves placed in it. That means that the vein is divided into as many chambers and that the pressure of the whole column of blood contained in the vein is distributed over so many valves. Had it not been for these valves and the consequent distribution of the pressure, the lowest parts of the vein would have been required to support the whole column of blood extending over nearly 3 feet and would have been seriously distended.

So we see that the valves are a great help in keeping the veins in a healthy condition. But it has to be noted that the maximum capacity of the veins is only the minimum that is needed to raise the blood to the heart. If for any reason there is a call upon the veins to do additional work, they immediately suffer; because they have no reserve energy for this augmented work. For example the veins of the lower extremities are *just* capable of carrying blood back to the heart, if a man does standing work only for a reasonable part of the day. But if his vocation requires abnormally long periods of daily standing, the veins find themselves too weak for their work, and on account of their distension, the blood begins to stagnate. It is under such circumstances that the disease called *varicose vein* develops. The first indication of varicose vein is a dull aching pain. The vein becomes much larger, knotted and distended; and in advanced cases becomes a source of much acute trouble.

We quote a paragraph from Gray's *Anatomy* in this connection:—

"A varicose condition is more frequently met with in the saphenous veins than in the other veins of the body,... The main cause of this is the high blood-pressure, determined chiefly by erect position, and the length of the column of blood, which has to be propelled in an uphill direction. In normal vessels there is only just sufficient force to perform this task; and in those cases where there is diminished resistance of the walls of

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the veins, these vessels are liable to dilate and a varicose condition is set up. This diminished resistance may be due to heredity, the vein-walls being congenitally weak, or may follow inflammatory conditions of the vessels. Increased blood-pressure in the veins, caused by any obstacle to the return of the venous blood, such as the pressure of a tumour,... or tight gartering, may also produce varicose. In the normal condition of the veins, the valves in their interior, break up the column of blood into a number of smaller columns, and so to a considerable extent mitigate the ill effects of the erect position; but when the dilatation of the veins has reached a certain limit, the valves become incapable of supporting the overlying column of blood, and the pressure is increased, tending to emphasize also the varicose condition."

Even when the venous distension and the consequent stagnation of the blood do not amount to a disease, the veins are very often in a serious condition and need artificial help for being restored to their normal health. The valves, owing to the increased pressure of the stagnant blood, become incapacitated, and instead of helping the situation, simply make it worse. Many veins, some of them considerably large, are not even provided with these valves. So it may be safely stated as a general rule that the venous blood circulation constantly stands in the danger of going bad and must always be kept intact by means of external help.

Physical culturists all over the world help the venous system to keep up its tone by means of exercises based on muscular contraction. When a muscle contracts, it presses upon the adjacent veins and pushes forth the blood contained in it. The amount of blood thus propelled gets beyond the upper valve and cannot slip back again, the vacant place being taken up by the blood from the lower portions of the veins when the muscle relaxes. Thus every contraction raises the venous blood, bit by bit, towards the heart; and the repeated muscular action serves to pump the venous blood up through the veins worked upon. This pump-like action, set up by repeated muscular contractions in order to raise venous blood

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against gravity, is a feature common to all non-Yogic systems of physical culture.

It will be readily seen, however, that the column of blood upon which the contracting muscle presses, will be divided by this muscle into two parts, one standing above the contraction and the other below it. The part standing above the contraction will be readily raised upwards in the vein as the valve lying in front of it will not offer any resistance to its passage. But the part standing below the contraction will be squeezed between the muscle and the lower valve, exerting considerable pressure upon the latter. No doubt the net-work of veins is so complicated, that the compressed volume of blood will find its way through other veins joining the vein concerned; but this diversion will relieve only a part of the pressure and the lower valve cannot but bear the remaining of it.

In Fig. XCIX, if we suppose that there are valves at *a* and *b*, and if we further suppose that the intermediate contracting muscle presses the vein at *c*; we will find that the column of venous blood standing between *b* and *a* will be divided into two parts *bc* and *ca*. Now the column *ca* will readily get out of the valve at *a*; but the column *bc* will not be able to find its way through the valve at *b* and will exert considerable pressure upon it. A part of this column of blood will pass through the veins *x*, *y* and *z*, but remaining part will continue to press upon the valve at *b*.

Now if these valves are in their normal health, these systems of physical culture help venous blood circulation; but if they are congenitally weak or being strong at birth have become subsequently degenerated, these systems fail, because the valves are not able to bear even the partial pressure.

The Yogic system of physical culture has decidedly a better way of helping venous circulation. In this connection it advocates the practice of Sarvāṅgāsana.[1] Now as the Fig. C will show, the whole column of venous blood stands inverted in this pose. At once the force of gravity begins to help the circulation, instead of

1 Śīrshāsana can also be practised with similar advantage.

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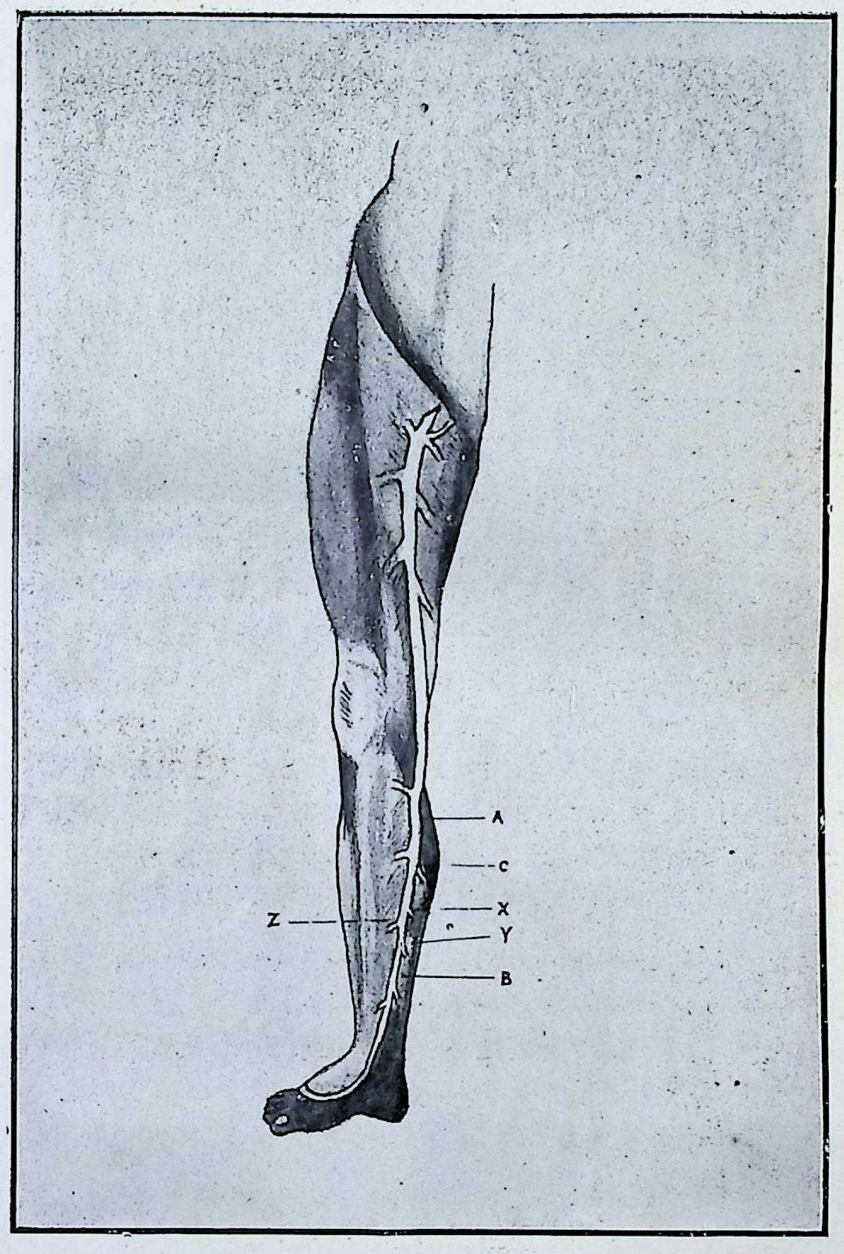
Fig. XCIX



The Great Saphenous Vein.

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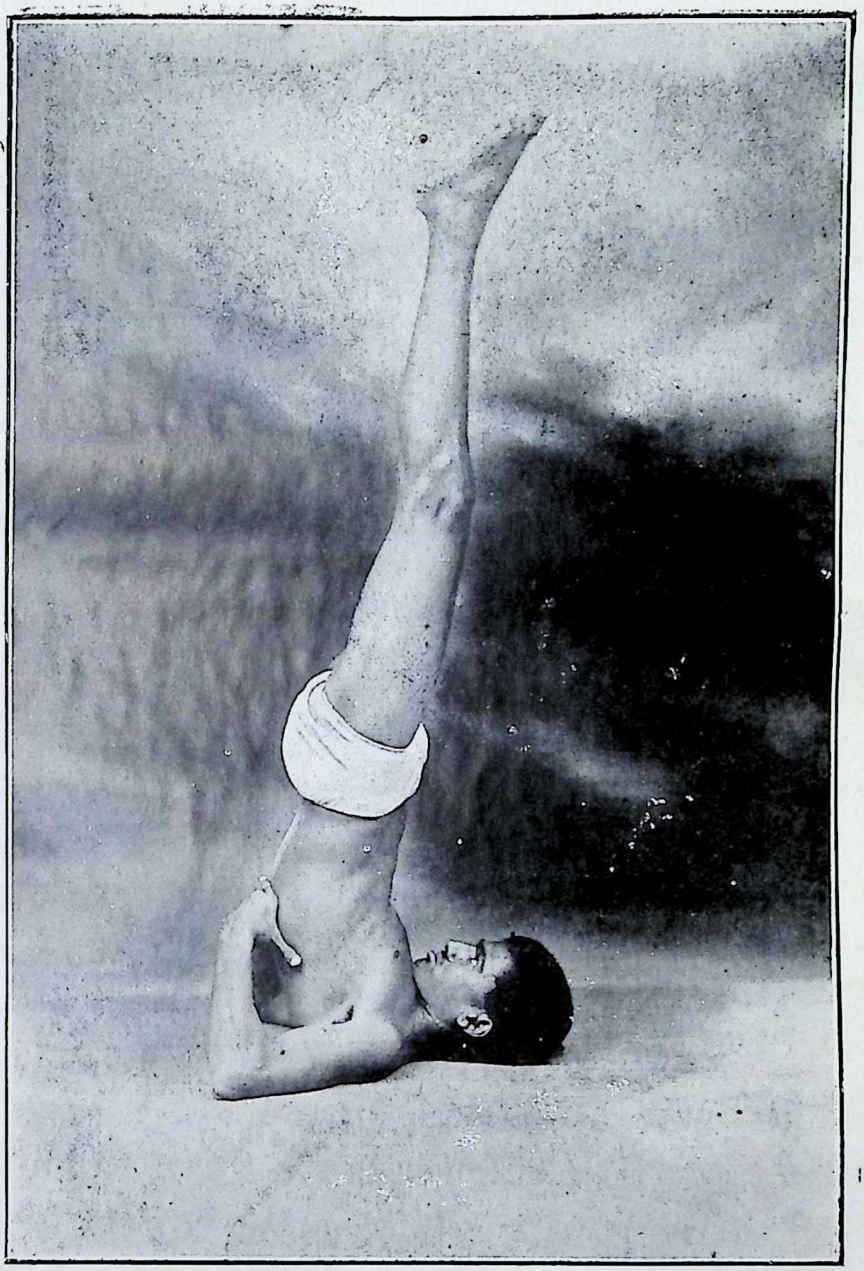
Fig. C



Sarvâñgâsana or The Pan-Physical Pose.
(Side view)

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going against it; and the valves are relieved of their pressure and begin to get complete rest. The veins start draining under the pressure of their own contents and the whole work becomes very smooth.

Now, it is an admitted principle of the medical science, that a degenerated organ should be given complete rest, if it is to regenerate. So if the degenerated valves are to be regenerated, they must be given complete rest. This is accomplished in Yoga by means of Sarvāngāsana, a pose invented by ancient Indians centuries ago. Even for a man of average health the Yogic method will be found to be excellent for venous blood circulation, because it gives maximum profits with minimum expenditure of energy.

In the last number we promised to discuss the Pan-Physical Pose as a cure against seminal weakness. This discussion had to be prefaced not only by two long scientific notes, but also by a statement on the influence of the pose on the venous blood circulation. This has taken up so much of our space that we cannot make even a passing reference to the physiological principles underlying this ailment and its proposed cure. We have to reserve this whole topic for the next issue when we hope to give full details of the subject.

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N. B.—Instruction in Yogic culture higher as well as lower will be given gratis at the Āśrama to everyone that earnestly seeks it.

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Miscellaneous

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Following diseases, especially in their chronic condition can be effectively treated by the Yogic methods :

1 *Constipation.*
2 *Dyspepsia.*
3 *Head-ache.*
4 *Piles.*
5 *Heart-disease (functional).*
6 *Neuralgia.*
7 *Diabetes.*
8 *Hysteria.*
9 *Consumption.*
10 *Obesity.*
11 *Sterility (certain types).*
12 *Impotence.*
13 *Appendicitis, &c.*

Therapeutical advice is given gratis at the Āśrama to patients coming for consultation.

Arrangements have been made under the supervision of the Āśrama for students and patients to stay on payment of actual expenses, Rs. 45/- per mensem.

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THE KAIVALYADHÂMA

N. B.—Throughout the literature issued by the Âśrama, the word 'Philosophy' is used in its widest sense. The proposed experimentation of spiritual experiences refers to the investigation of psychic-phenomena according to the methods of Psycho-physiology.

THE IDEAL

THE Western philosophy, ever since the days of Greek thinkers, has continued to be merely speculative; and though of late it is exhibiting a biological tendency, it has neglected 'man' the highest biological product so far as his noblest spiritual experiences go. The Western sciences, in their triumphant march, are ever singing songs to materialism, and have little leisure to attend to spiritualism, and its wonders. Thus the Western thought, either philosophical of scientific, dose not experimentally take account of the sublimest in man.

The Indian philosophy, though based on the spiritual experiences of man, has been throughout its course, subjective. Swâmi Vivekânada and others, indeed, tried to explain some of its principles in the light of modern sciences. But as they never took to experimentation, it again remained exclusively subjective; and they could not add the objective side to it.

The Kaivalyadhâma proposes:

(i) To carry the biological tendency of the Western philosophy to its logical conclusion by tackling scientifically the highest states of human experience.

(ii) To make the Western laboratory methods of research reveal spiritual wonders,

(iii) To develop the objective character of the Indian philosophy by subjecting the individual spiritual experiences of man to experimentation.

Thus the Kaivalyadhâma has for its principal ideal the co-ordination of the Western and Eastern thought; and hopes, by their assimilation, to work out a philosophy which will perhaps give satisfaction to the greater part of humanity.

The Yogins, right from Patan'jali, the greatest exponent of Yogic science know how to induce the highest spiritual stages. As the objective sciences had not developed till late, it was not possible for these stages to be experie mented upon; and though lately there has been a startling advance in modern sciences, their exclusive material tendency and the equally exclusive spiritual tendency of the Yogins have led to a complete but an unlucky divorce of the two schools of thought. The Kaivalyadhâma is anxious to wed these

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together and produce results which will lead to the realisation of the ideal indicated above.

Though the application of modern sciences to the Yogic lore will directly enrich the theoretical side of psycho-physiology, it will indirectly shed new light upon many allied sciences and will materially help the practical side of spiritual and physical culture.

THE WORK

The Kaivalyadhâma is to be established at Lonavla or thereabout. This sanitarium is blessed with ideal climatic conditions and is within easy railway communication both from Bombay and Poona, the two big centres of modern civilization on this side of the country. Nature is very inspiring all around. And since the locality affords the necessary seclusion for an Âśrama a religious retreat, it has been found very suitable for an institution of the type of the Kaivalyadhâma.

Like every other research institute the Kaivalyadhâma will require a certain equipment :—

(i) The libraries, laboratories and hospitals.

(ii) The operators.

(iii) The subjects.

(iv) The buildings.

As the most important and up-to-date literature bearing on the modern problems of spiritual and scientific thought will have to be stocked in the libraries, they will cost nothing short of Rs. 200,000. The laboratories will contain the most sensitive instruments that the human genius has ever invented and since the equipment will be, as far as possible, complete, this may require a minimum expenditure of Rs. 500,000. The experiments in the field of psycho-physiology, spiritual and physical cultures etc., will have to be conducted not only in the laboratories but also by the bed-side of the patients. This clinical experimentation will entail the maintenance of large hospitals, the current outlay on which may amount to Rs. 25,000 annually in addition to initial expenditure of Rs. 50,000 for the necessary equipment. This research requires the services of experts and will annually demand Rs. 50,000 for their salary. As the Kaivalyadhâma proposes to co-ordinate the modern sciences and the Yogic lore, by the very nature of the work, the subjects required for experiments will be not dogs and frogs but highly trained human youths maintained as a regular army in the highest condition of efficiency. Even on a moderate calculation, this will put the Institution to a yearly expense of at least Rs. 100,000. As regards buildings, they demand Rs. 250,000 even on a humble scale. Thus an initial expenditure of Rs. 1000,000 plus an annual outlay of Rs. 175,000 is the cost of founding and maintaining the Kaivalyadhâma in a

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respectable state of efficiency. The ideal can only be realized after years of vigorous and selfless work carried on by bands of workers anxious to serve humanity by an earnest search for truth !

THE SUBORDINATE IDEALS

In these days of economic pressure, these vast sums may appear to be an undue waste of money over matters that seem to have no more than academic interest. But that is not the case. In the first place, it is these research institutes that materially influence the national life; and India cannot occupy a a respectable place in the council of nations unless and until she organizes these research institutes on a large scale and thereby elevates her national character. The Kaivalyadhâma, however, proposes not only to conduct the above mentioned research, but also wants to start institutions of higher education in sociology, spiritual and physical culture. It also intends sending out youths that will selflessly help the building up of their nation. Practical politics will have, however, absolutely no place in the Âśrama. The working of these institutions of higher education will not entail any additional expenditure as the central institution will have equipment sufficient for their conduct.

THE CONCLUSION

A word about the organizer will not be amiss here. None can be more conscious of his weaknesses and shortcomings than the organizer himself ! The mere thought of the stupendous character of his work simply alarms him ! But he is helpless in the matter ! He is called on to start the work by powers which he has not yet been able to fathom completely and he has obeyed the call ! He knows that his all merciful Master, S'rîmân Paramahaṅsa Mâdhavadâsa Mahârâja of Malsar is guarding and guiding his footsteps along this path ! He earnestly believes that the work is for his spiritual elevation ! Whether this elevation will come through what is called success or failure, he knows not ! It was for him to obey the call and he has obeyed ! That is all !

The East and the West have progressed for centuries along their respective lines. The world is awaiting the assimilation of their cultures and the consequent peace and prosperity to humanity. The Kaivalyadhâma proposes to help this assimilation not only by its research but by training people who will stand for ideals that will promote this assimilation, and entreats every human being to help it in its work as best as he can.

May the Lord bless this Âśrama and enable its workers to realize its ideals by humble and selfless service to humanity !

Kun'javana,
LONAVLA,
June 10, 1924.

Kuvalayânanda
(J. G. GUNE)

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TOWARDS FOUNDATION AND AFTER

INTRODUCTION

The first leaflet entitled 'The Kaivalyadhâma' states in general terms the ideals of the proposed Âśrama– Institute– of that name, along with a rough estimate of the cost of founding and maintaining it. This paper describes tersely what has been done upto now towards the foundation of this Âśrama, and also makes a brief statement of the work the organizer henceforth proposes to do before and after its foundation.

HOW THE IDEA OF THE INSTITUTE ORIGINATED

As the organizer was being trained in advanced Yogic practices, he began to have experiences which were quite abnormal. Phenomena, physical and mental, that an average man is not able to induce, came slowly under his control. Naturally they excited curiosity in him as to whether these phenomena were purely physiological or purely psychological or whether they were psycho-physiological having their counterparts both in physiology and psychology. He saw Yogins and consulted Yogic literature. He talked to eminent medical men and read books on psychology and physiology. But he could not get any scientific explanation of his experiences. He found that with all the surprising progress that had been made by the modern sciences in general and physiology in particular, they had not anything to say on these phenomena. The Yogins knew nothing of the modern sciences. The organizer could, indeed, find some literature on these phenomena, published both in the East and the West; but as the writers had never tried any experiments and had freely indulged in speculation, their explanations were anything but scientific.

Though this search after ready-made scientific interpretation of Yogic facts brought disappointment to the organizer, it filled him with new hopes. He could realize by his studies of Yoga and modern sciences, that the latter had come to a stage sufficiently advanced to tackle problems relating to the former and that if the laboratory methods were used in investigating the Yogic phenomena, the results would not only enrich such sciences as Physics, Biology, Physiology, Anatomy, Therapeutics etc., but also would make it possible, at least after centuries of labour, to reconstruct Philosophy in many of its aspects. The truths discovered in this research would scientifically explain the methods applied to spiritual and physical culture in Yoga and would render it possible to determine the relative worth of these methods and the methods obtaining in other cultures of a similar nature. The Yogic culture has also a therapeutical side which constitutes a system of Naturopathy. The scientific

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study of Yoga would not only give a scientific basis to this system but also would show how it compares with other systems working in the same field.

All this seemed so full of possibilities and so inviting that the organizer began to be restless over the matter. The idea of scientific research in the field of Yoga kept haunting him night and day. But his full consciousness of the vastness of the work compared with the smallness of his individuality and the slenderness of his means simply staggered him; and had he not felt that he had a call from above to undertake the work, he would never have ventured upon this ambitious path ! He had to obey the call and at last, to make up his mind to undertake the task by proposing to found an Âśrama devoted to this work !

THE FIRST STEPS

The organizer was fully aware that the Research Institute he was going to organize was altogether a new idea in the world and would not meet with the sympathy of the general public, if its research were to confine itself to Psycho-Physiology alone. Even the man of science would be reluctant to lend his support because of his ignorance of Yoga and consequent discounting of the success of the attempt. But it was thought possible to enlist the sympathy of the scientific as well as the popular world, if the research would attempt to solve certain practical problems bearing on the every day life of the ordinary people. This could be done by tackling first the Physical Culture and Therapeutical sides of Yoga, the phycho-physiological research being taken up afterwards. Accordingly it was planned that some work be done in this direction even before the regular Âśrama was founded, that the results be placed before the medical men and the public with a view to secure their sympathy, and that if this could be successfully done, to found the Âśrama later on when arrangements would be ready for making at least a humble beginning in psycho-physiological research.

The organizer found himself not altogether unequipped with the means required to execute this plan. A small sum of a few thousands was readily subscribed by his friends and sympathizers, Shreemant Pratapsheth afterwards contributing Rs. 5,000. The organizer was, at that time, closely connected with the K. E. Society's educational institutions. He was in sole charge of the Physical Culture Department of the Society and consequently could get a number of students under his training both in physical and Yogic cultures. These were at his disposal as subjects for experimentation. Prof. Gokhale of the Society, who bears brotherly affection to the organizer, was available as a consulting scientist. Drs. Nûlkar and Mhaskar, then honorary workers on the Society's staff, readily rendered all the necessary help in directing the research.

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Dr. Bhatta of Baroda, the X-Ray expert of the state, gladly co-operated in conducting the X-Ray experiments.

The organizer himself had peculiar advantages in directing research in Yogic physical culture and therapeutics. He had the privilege of being a humble disciple of Prof. Maṇikrao, the far-famed physical culturist of India. The fatherly love with which the organizer was trained in physical culture by the saintly professor had created in him an undying interest in this field of human activity. Virtues necessary for ably conducting an institute, such as the organizer proposed to found, were all pre-eminently present in Prof. Maṇikrao and had left a deep impression on his humble disciple. The very inspiration for research came through his example. As the Director of Physical Culture in the K. E. Society's institutions, the organizer had ample opportunity to study the problems not only of physical culture but also of therapeutics, especially of chronic diseases.

With this equipment, the first experiments were tried on the digestive tube. The Yogic exercises were studied under X-Ray, which threw light on a number of physiological facts hitherto unknown. The barometer was taken advantage of in explaining particular Yogic phenomena. The results were very gratifying and encouraging. This research was shown to Dr. Tagore, Dr. Bose and Dr. Nadgir (Bom.). They were all pleased with it and urged the organizer to carry on his work. Dr. Tagore informed, in writing, through Mr. C. F. Andrews, that the work was 'interesting and worth further investigation'. In a letter addressed to the organizer, Dr. Nadgir declared that 'the methods were scientifically sound' and 'the object was laudable'. Dr. Bose did not say anything in writing but orally expressed his satisfaction at the work done and repeatedly warned the organizer not to give up his research. Others, less known to the world, also were much pleased with the work and showed their sympathy.

FURTHER

Emboldened by this success, the organizer carried on his research vigorously. It was soon discovered that no substantial progress would be possible, unless an independent institution solely devoted to this cause was started. Luckily an opportunity offered itself for the organizer to be free from the K. E. Society's tie. He immediately shifted to Lonavla and there began his work of organizing the proposed Institute.

The research work as far as it has reached to-day leads to the following conclusions. The Yogic system of physical culture compares very favourably with others obtaining in the field, as it has none of the disadvantages which the others have. Its aim is to secure greatest longevity with highest physical efficiency and maximum brain power. It is peculiarly fitted for the females.

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Yoga as a system of preventive exercises is simply marvellous as it keeps the whole nervous and glandular mechanism in the healthiest condition. Even as a system of therapeutics, Yoga stands above all the other types of Naturopathy. It is peculiarly capable of curing chronic diseases. Against constipation, dyspepsia, head-ache, piles, heart-disease, neuralgia, obesity, diabetes, hysteria, consumption, and a number of other dangerous diseases, its work is simply surprising. Impotence can be invariably cured and certain types of sterility, especially in women, can be easily removed. No system of treatment can boast of being even equal to the Yogic in making up for the ravages of masturbation. Mental disorders can best be set right by Yogic Therapeutics.

The organizer feels confident that the results in the field of psycho-physiology and spiritual culture will be equally encouraging. He has come to the conclusion that a time has come when the results, already arrived at, should be placed before the public both in scientific and popular forms. This he means to do by writing in papers and periodicals and also by delivering magic lantern lectures at different centres in India. Arrangements for these things have already been completed.

THE START

These writings and speeches will, it is hoped, enable the organizer to get the necessary sympathy of the public; and with this he feels assured he can start the Institute on the 7th of October, 1924. Arrangements have already been made to temporarily house the Institute in a nice bungalow, acquisition of permanent premises being only a question of time. Chronic patients have already begun to pour in and a number of university men have begun to receive instruction in physical and spiritual culture. Educated youths are offering their services to the cause of the Âśrama. This work that has so long been silently done is sure, when placed before the public, to attract their attention; and the organizer feels confident of getting the necessary help at their hands. If his expectations are fulfilled, the Institute will immediately enter upon its full activity on a large scale. But even if he gets only a slow response, he is sure to work the whole programme. Only it will be done on a smaller scale.

THE SCHOOL OF SPIRITUAL CULTURE

One of the activities that the Âśrama will begin is to start a School of Spiritual Culture. It will be called Yoga-Vidyâlaya. Only those students that shall have passed their entrance examination of a university will be admitted to this School. They will be maintained at the expenses of the Âśrama under certain conditions. Paying students will also be allowed to join this Yoga-Vidyâlaya, provided they undertake to obey the discipline of the Âśrama. The complete course will extend over four years during which

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along with spiritual training, they will receive instruction in such other subjects as would make them competent to render social service, in their after life, under the direction of the Institute.

THE RESEARCH

As the students of the Yoga-Vidyâlaya will be systematically and carefully trained in Yogic culture, psycho-physiological research will start as soon as they will have made a little progress. Research in Yogic Therapeutics and physical culture will continue, but will be more actively conducted. In addition to the laboratory experts that the Institute may command, facilities for research work available in Bombay and Calcutta will also be taken advantage of.

YOGIC TRAINING FOR OUTSIDERS

One of the most sacred duties that the Âśrama has to perform is giving free instruction in Yogic culture to outsiders. There are a number of people anxious to develop along Yogic lines, if they could do so without being required to give up their vocation. Such people, whenever they find spare time, may make arrangements for their boarding and lodging in the neighbourhood of the Âśrama and receive the necessary training.

THE THERAPEUTICAL SIDE

The Institute will not only continue to treat chronic patients in Lonavla, but will make arrangements for this work also in Bombay. A small hospital will be opened under its management at Lonavla where patients requiring indoor treatment will be admitted. People suffering from diseases referred to above will get a speedy cure not only on account of the excellence of Yogic treatment but also on account of the healthy climatic conditions of the place.

THE QUARTERLY

Though the organizer will, from time to time, be writing articles bearing on the research work of the Âśrama, in Indian and foreign papers and periodicals, it is necessary that the Âśrama should have its own organ publishing systematically its own researches. It is, therefore, decided to start a Quarterly called the Yoga-Mîmâṅsâ from October 1924, under the auspices of the Institute. Each number will cover 80 pp. of the demy 8vo size including 16 full page illustrations. The matter will appear under three sections. The Scientific Section will give researches in their naked form. The Semi-Scientific Section will show the application of these researches to spiritual and physical culture, therapeutics etc., along with copious anatomical and physiological notes. The treatment of this section will be, no doubt, scientific; but the

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exposition will be so easy as will be readily intelligible to any well-informed reader. The Popular Section will attempt a scientific explanation of the Yogic culture, but the basis will not necessarily be the research of this Âśrama. Thus the matter appearing in the pages of the Yoga-Mîmâñsâ will be very valuable to the scientific as well as the popular world; and as nothing but original thought will be recorded therein this literature in sure to command the attention and esteem of every intelligent man.

AN APPEAL

Yogic culture is one of the richest legacies the ancient Indian savants have left to the world. The noble spiritual elevation that is seen in India even in her present deplorable condition is mainly due to the influence of Yoga in one form or another. A revival of this culture is sure to raise her to her former position of glorious dignity. The Âśrama is trying to bring Yoga in co-relation with the present day culture by attempting a scientific interpretation of its truths. It undertakes to train youths who will stand for whatever is best in the different cultures of the earth, ancient or modern. Under these circumstances, the organizer humbly begs to suggest that it is the duty of every individual, who cares for the progress and well-being of humanity, to show his active sympathy to the Âśrama and enable its workers to realize its noble ideals.

Kun'javana,
LONAVLA,
June 10, 24.

Kuvalayânanda,
(J. G. GUNE)
ORGANIZER

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The Director of the Kaivalyadhâma is ever willing to help those who are in earnest about their spiritual advancement, as he confidently feels that this help will in a way help his cause.

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Yoga-Mīmānsā

A Quarterly Organ of the Kaivalyadhama
Recording Scientific Researches
IN
Psycho-physiology, Spiritual and Physical Culture etc.,
with their application to Therapeutics.

Each number covers 80 pp. of the royal 8vo size including 16 full page illustrations. The matter is divided into four different sections so as to meet the needs of all types of readers. The journal appears in the middle of January, April, July and October. Third Volume began in January 1928.

Annual Subscription, Post Free, Per Volume & Single Copy respectively: India Rs. 7 & 2, (V. P. charges annas 4 extra); America $ 3.50 & 1.00; other Foreign Countries Sh. 15 & 4.

N. B.—Vols. I–II Complete, Each sells as follows: India Rs. 9, (V. P. charges annas 4 extra); America $ 4.00; other Foreign Countries Sh. 17. Post Free. Single copy not available.

A FEW APPRECIATIONS

"During the last few years a gallant attempt has been made, under the supervision of Swami Kuvalayananda to carry out a systematic and practical study of Hatha-Yoga, by applying to it Western methods of observation, with a view to demonstrating its *raison dêtre* and its high therapeutic value. The results of these studies by Indian practitioners have been appearing in his very valuable periodical called *Yoga-Mimansa*." **The Quest, London.**

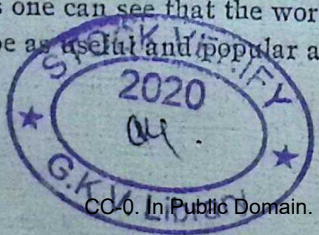
"Physical culturists, medical men, experimental psychologists and those who are classed as general readers should find the periodical interesting and instructive." **The Modern Review, Calcutta.**

"The object of the journal, which is full of novel and interesting subject matter from the beginning to the end, is to record scientific researches in physiology, spiritual and physical culture etc., with their practical application to therapeutics. We are quite proud to emphasise the fact that the Swamiji has fully succeeded in his mission. The magazine is for everybody. The various poses and practices of Hatha Yoga with their utility in curing different diseases have been well described and illustrated with excellently done-up half-tone photographs. We wish the journal every success."

The Journal of Ayurveda, Calcutta.

"From its general appearance and get-up of the journal and the matter it contains one can see that the work is in able hands and in time the institution will be as useful and popular as the New York Institute of Science."

United India & Indian States, Delhi.



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पुस्तकालय

गुरुकुल कांगड़ी विश्वविद्यालय, हरिद्वार

पुस्तक-वितरण की तिथि नीचे अंकित है।
इस तिथि सहित १५ वें दिन तक यह पुस्तक पुस्तकालय में वापिस आ जानी चाहिए। अन्यथा ५ पैसे प्रतिदिन के हिसाब से विलम्ब दण्ड लगेगा।

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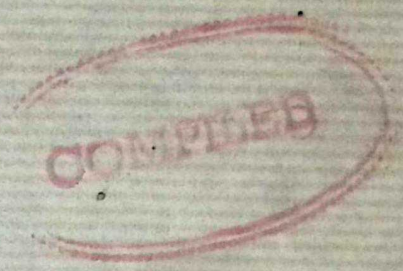

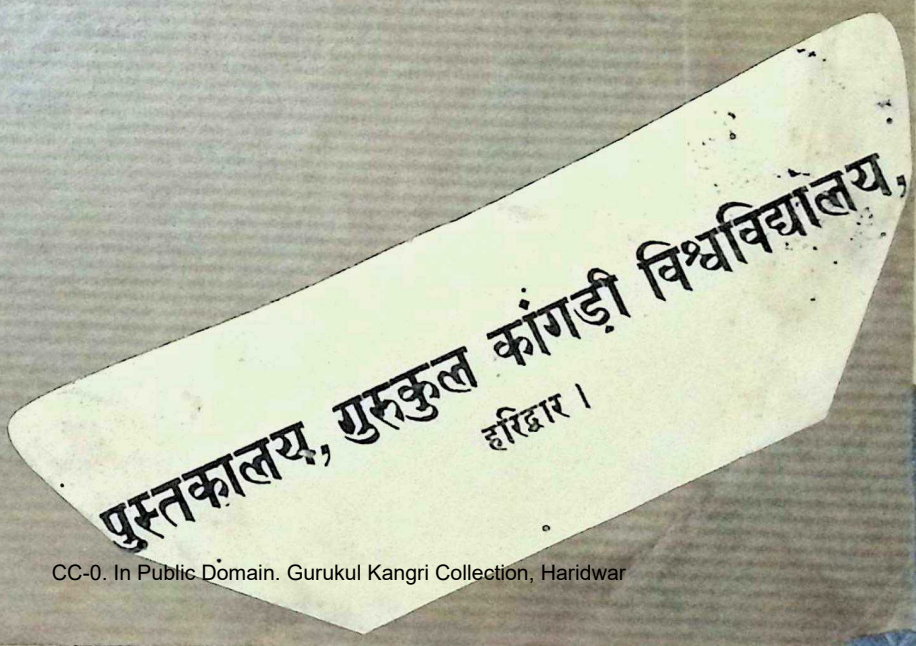

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